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Acoustics Today

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Taking American National Standards to the International Level

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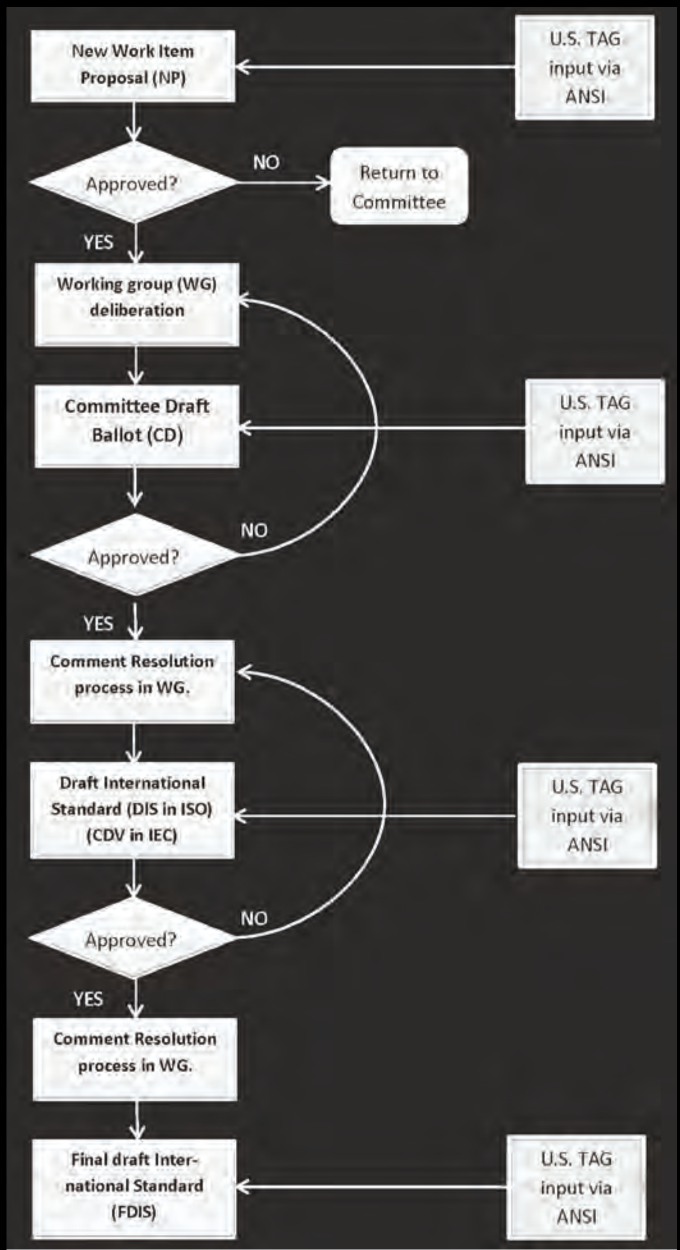
Modern Tools for Improving the Development of Acoustical Standards

and more



A publication of the Acoustical Society of America

Demystifying Standards

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ACOUSTICAL SOCIETY OF AMERICA

The *Acoustical Society of America* was founded in 1929 to increase and diffuse the knowledge of acoustics and to promote its practical application. Any person or corporation interested in acoustics is eligible for membership in the Society. Further information may be obtained by addressing Elaine Moran, ASA Office Manager, Acoustical Society of America, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502; Phone: 516-576-2360; Fax: 516-576-2377; E-mail: asa@aip.org; Web: AcousticalSociety.org

FUTURE ARTICLES

Psychological and Physiological Acoustics

Marine Mammals and Fish

Medical Acoustics

Physical Acoustics

ACOUSTICS TODAY (ISSN 1557-0215, coden ATCODK) January 2012, volume 8, issue 1 is published quarterly by the Acoustical Society of America, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502. Periodicals Postage rates are paid at Huntington Station, NY, and additional mailing offices. POSTMASTER: Send address changes to Acoustics Today, Acoustical Society of America, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502.


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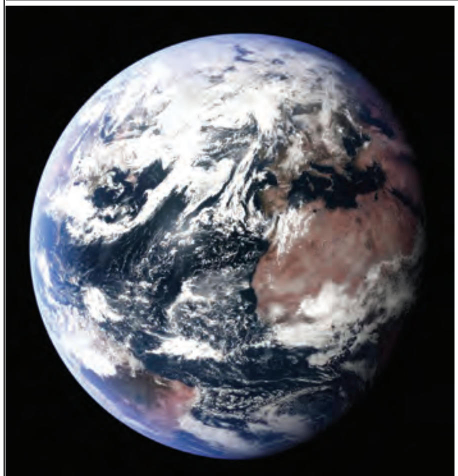
ASA School 2012



Living in the Acoustic Environment

20–21 October 2012
Kansas City, Missouri

ASA School 2012 is a new Acoustical Society of America event where graduate students and early career acousticians in all areas of acoustics can learn about and discuss a wide variety of topics related to the interdisciplinary acoustical theme *Living in the Acoustic Environment*.

ASA School 2012 will provide opportunities for meeting faculty and fellow students, discussing research topics, developing collaborations and professional relationships within acoustics, and mentoring.

Program and Costs

Six lectures will be given each day by distinguished acousticians covering topics in Architectural Acoustics, Engineering Acoustics, Musical Acoustics, Noise, Psychological and Physiological Acoustics, and Speech Communication. The registration fee is $50. Hotel rooms for two nights (double-occupancy), meals, and course materials are provided by ASA. Participants are responsible for their own travel costs.

Participants and Requirements

ASA School 2012 is targeted to graduate students in all areas of acoustics and early career acousticians (within 3 years of terminal degree). Attendance is limited to 40 participants who are expected to attend all School events and the ASA meeting immediately following on 22-26 October 2012. ASA School attendees are required to be an author on an abstract for presentation at the ASA meeting.

Application and Deadlines

The application form and preliminary program will be available online on 1 May 2012 at www.AcousticalSociety.org. Applications are due by 1 August 2012 and applicants will be notified of their acceptance in the ASA School by 4 September 2012.

More Information

Please see **www.AcousticalSociety.org** for more information

Acoustics Today

A Publication of the Acoustical Society of America

Volume 8, Issue 1 **January 2012**

Cover: International Standards Organization/International Electrotechnical Commission (ISO/IEC) standards development process (simplified).

THE ACOUSTICAL SOCIETY OF AMERICA INVITES APPLICATIONS FOR THE POSITION OF

PUBLICATIONS MANAGER

POSITION DESCRIPTION

Reporting to the Editor-in-Chief, the Publications Manager will lead a strategic, integrated program to ensure success of all publications of the Acoustical Society of America (ASA). This includes working with editors, associate editors and researchers to develop content, gathering and prioritizing product and customer requirements through market research, and interfacing with the publisher's editorial and production operations to provide a seamless process for all contributors to ASA publications. This position will support the overall strategies and goals of the Publications Office and requires representing ASA publications to all external stakeholders. This is a newly created full-time position for the ASA, to be located in the recently established Publications Office in West Barnstable, Massachusetts, with recruitment of additional support staff anticipated.

KEY RESPONSIBILITIES

The Publications Manager is the chief point-of-contact and coordinator for all publications activities of the ASA.

Editorial functions

- Develop and generate, with the Editors, a strategic publications plan to ensure ASA products are the leading publications in their fields
- Work with the publisher's marketing and sales staff to showcase ASA publications across media channels including the web and social media, and conduct author outreach to engage community and develop and promote ASA products
- Identify and commission content that will increase the scientific quality and impact of publications and work with the Editors on acquisition of such content
- In conjunction with the Editor-in-Chief, establish, monitor and modify policies and/or procedures to enhance the publications process
- Identify hot/special/emerging topics

Marketing functions

- Work closely with the Editors to determine content as a basis for marketing efforts and for focused online features aimed at generating or enhancing presence in key areas
- Work with the publisher's marketing staff to ensure marketing materials are up-to-date and reflect new features and enhancements
- Publicize and market ASA publications utilizing all internal communication tools
- Develop and implement programs to increase external marketing of ASA publications in collaboration with the publisher and other organizations
- Support ASA fundraising efforts as needed

Managerial functions

- Monitor all product related statistics, make forecasts, ensure contingencies are in place, and periodically report to ASA Officers and Managers and the ASA Executive Council on publication activities and programs

- Develop appropriate budget recommendations and projections for products
- Coordinate and understand all publication operations, including their costs and workflow distribution
- Work with the Editor-in-Chief and ASA Treasurer to develop and manage the publications budget
- Assist in selection of vendors
- Supervise administrative/technical staff as required/needed

QUALIFICATIONS

Bachelor's or advanced degree and minimum of 5 years experience in scientific publishing, including editorial functions, budgeting, product development, and/or market research. Excellent teamwork, time management, and organizational skills as well as the ability to take responsibility, assess complex situations, and work on own initiative. Familiarity with sciences and technologies related to acoustics is not necessary, but desired. Travel required.

Specialized skills required

- Excellent organizational capability with the ability to multitask and prioritize projects based on publications goals and strategic plan
- Excellent oral communication and interpersonal skills
- Professional level writing and editing skills
- Ability to effectively interact with a wide range of constituencies
- Highly computer literate knowledge of and experience with publication tools and online scientific communication

Specialized skills desired

- Familiarity with online peer review and pre-publishing tasks
- Capability of translating highly technical research into stories or other content for general public consumption
- Experience with strategic use of social media

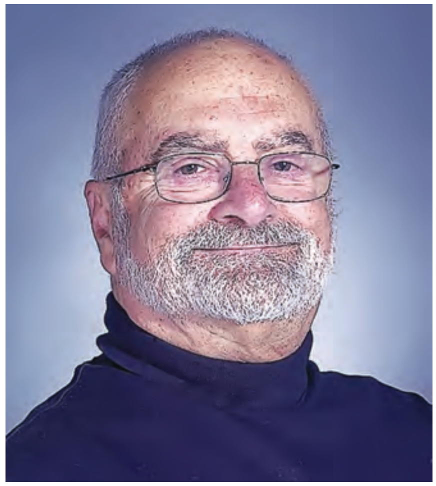
EMPLOYER DESCRIPTION

The Acoustical Society of America is a nonprofit professional society with over 7000 members worldwide. It was founded in 1929 to increase and diffuse the knowledge of acoustics and promote its practical applications. The main office of the Society is located in Melville, New York. The Society is a member of the American Institute of Physics (AIP), a nonprofit organization that provides human resource, data management, and publishing and marketing services to ASA. Detailed information of the Society and its extensive publishing activities can be viewed at the Society's web site: http://acousticalsociety.org. The Acoustical Society of America is an equal opportunity, affirmative action employer.

Applications including a cover letter, resume, and names of three references should be sent to the Human Resources Division of the American Institute of Physics, lmagri@aip.org.

FROM THE EDITOR

Dick Stern
1150 Linden Hall Road
Boalsburg, Pennsylvania 16827



This issue of *Acoustics Today* is the first time that all the articles were derived from the presentations of a special session of an Acoustical Society of America meeting. The 162nd meeting of the Society took place in San Diego, California this year and the special session was titled *Demystifying Standards*. It was organized by Paul Schomer and Susan Blaeser, who are also the guest editors of this issue. The authors of the articles were the presenters at the session. My congratulations go to Paul and Susan—first, for organizing the session and second, for their ability to convince the presenters to rewrite their presentations for a magazine format. The articles are excellent. We hope that members of the Society will decide to join many of their colleagues and volunteer for standards work. If you like meaningful problems to solve that come to closure, standards might be just the thing for you.

FROM THE GUEST EDITORS

Paul D. Schomer
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and
Susan B. Blaeser
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Melville, New York 11747

The Acoustical Society of America (ASA) Committee on Standards (ASACOS) sponsored a special interdisciplinary session at the 162nd Meeting of the Society in San Diego entitled *Demystifying Standards*. The goal of this session was to bring together a number of invited papers that would demonstrate the technical breadth of the ASA Standards Program and its value to stakeholders including those from industry, government, consultants, and others. We wanted to explain the importance of standards, not only within the U.S., but internationally. Finally, we wanted to highlight the role of ASA in enabling and facilitating the development of both American National Standards and International Standards related to acoustics and vibration. Papers presented in the session are adapted here so that they reach a wider audience.

The ASA Standards Program serves the country and is directed at both the members of the Acoustical Society and society in general. ASA has been involved in standards development virtually since the inception of the Society and ASA's members have been leaders in this process at the national and international levels. Standards are the ultimate method to "promote the practical application of acoustics," which is one of the stated purposes of the ASA. Standards represent the distillation of years of research and practical experience. Many standards users are not acousticians but they are able to benefit from the work of ASA members (and others) by choosing to use voluntary consensus standards to support their decisions.

ASA's presence in the standards development community is significant compared to other organizations of its type and size. This is a reflection of the continuous support for the standards program demonstrated by ASA's Executive Council through the years.

The key strength of the ASA Standards Program is its more than 500 volunteers. The latest additions to the Standards Program are our National Subcommittee on animal bioacoustics and our International Subcommittee on underwater acoustics. With these, our Standards Program serves nearly all the technical areas of ASA. We hope that you will enjoy reading these papers written by standards volunteers (and staff) and that you will be moved to join us to help make this Program something that is of value to you.

THE ACOUSTICAL SOCIETY OF AMERICA STANDARDS PROGRAM: ORGANIZATION AND SCOPE

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Champaign, Illinois 61821

Introduction

The standards program of the Acoustical Society of America (ASA) is fundamental to the Society and directly serves its stated purpose—to increase and diffuse the knowledge of acoustics and promote its practical applications. Standards are one of the foremost ways that the society accomplishes its purpose of promoting the practical application of acoustics.

"Standards are one of the foremost ways that the society accomplishes its purpose of promoting the practical application of acoustics."

Since the inception of the society in 1929, members have been actively involved in the development of acoustical standards. The very first standards work began in 1930 and dealt with standardizing a sound level meter and its use. For those of you who know him, Bob Young was there and making his ideas known. So the society has an 82-year history of acoustical standards development.

Naturally, over these 82 years, the standards program has taken on various different shapes and forms. At an age of 82, it predates the International Organization for Standardization (ISO) and the American National Standards Institute (ANSI). This paper describes the current program, its makeup, and operation.

Standards program organization

There are four constituent parts to the standards program organization. The governance of the standards program is by the Acoustical Society of America's Committee on Standards (ASACOS), and there are 3 operating elements under ASACOS. First, there are the committees that develop the American National Standards. These committees are accredited by ANSI, and are termed accredited standards committees (ASCs). National Standards developed by these committees are given the designation ANSI/ASA and are copyrighted by the ASA. Second, there are the ISO/IEC Technical Advisory Groups (TAGs). These TAGs provide the United States' input to the development of ISO and IEC standards. Third, there are ISO secretariats. These secretariats provide the management and operation of ISO committees or subcommittees.

There are four ASCs and one subcommittee that develop American National Standards under the umbrella of ANSI. These are the so-called "S" committees. There is S1, Acoustics; S2, Mechanical Vibration and Shock; S3, Bioacoustics; S12, Noise; and the relatively recent addition of S3/Subcommittee 1, Animal Bioacoustics.

The "S" committees

S1, Acoustics, develops standards with such topics as acoustical terminology, sound level meters, filters, noise dosimeters, etc. The scope of ASC S1 is:

> Standards, specifications, methods of measurement and test, and terminology in the field of physical acoustics including architectural acoustics, electroacoustics, sonics and ultrasonics, and underwater sound, but excluding those aspects which pertain to biological safety, tolerances and comfort.

S2, Mechanical Vibration and Shock, develops standards with such topics as calibration of shock and vibration transducers, vibration of buildings, and human vibration thresholds, etc. The scope of ASC S2 is:

> Standards, specifications, methods of measurement and test, and terminology in the field of mechanical vibration and shock, and condition monitoring and diagnostics of machines, including the effects of exposure to mechanical vibration and shock on humans, including those aspects which pertain to biological safety, tolerance and comfort.

S3, Bioacoustics, develops standards with such topics as speech interference levels, articulation index, and specification of hearing aids, etc. The scope of ASC S3 is:

> Standards, specifications, methods of measurement and test, and terminology in the fields of psychological and physiological acoustics, including aspects of general acoustics, which pertain to biological safety, tolerance and comfort.

A few years ago, Subcommittee 1, Animal Bioacoustics, was added under ASC S3. ASC S3/SC 1 is planning to develop standards with such topics as measuring ambient noise in low-noise situations such as parks and wilderness areas, underwater passive acoustic monitoring for bioacoustic applications, noise and vibration in animal laboratory facilities, etc. The scope of S3/SC 1 is:

> Standards, specifications, methods of measurement and test, instrumentation and terminology in the field of psychological and physiological acoustics, including aspects of general acoustics, which pertain to biological safety, tolerance and comfort of non-human animals, including both risk to individual animals and to the long-term via-

bility of populations. Animals to be covered may potentially include commercially-grown food animals; animals harvested for food in the wild; pets; laboratory animals; exotic species in zoos, oceanaria or aquariums; or free-ranging wild animals.

S12, Noise, is the youngest of our S committees, with an age of about 30 years. S12 develops standards with such topics as environmental noise measurement and assessment, measurement of sound power, measurement of hearing protectors, etc. The scope of ASC S12 is:

Standards, specifications, and terminology in the field of acoustical noise pertaining to methods of measurement, evaluation, and control; including biological safety, tolerance and comfort, and physical acoustics as related to environmental and occupational noise.

The TAGs

The standards program currently administers 9 TAGs corresponding to the 9 ISO/IEC committees or subcommittees in which we participate. First, we participate in ISO/TC 108, Mechanical vibration, shock and condition monitoring, and in 4 of its subcommittees, for a total of 5 TAGs. Second, we participate in ISO/TC 43, Acoustics, and 2 of its subcommittees, for a total of 3 TAGs. Finally, we participate in IEC/TC 29, Electroacoustics. Table 1 lists these 9 TAGs. The scopes for the Technical Committees and the Subcommittees that have their own scopes follow.

The scope of ISO TC 29 is:
To prepare International Standards related to instrumentation and methods of measurements in the field of electroacoustics.

Excluded from the scope are:

- standards for sound and video recording as dealt with by TC 100;
- standards for equipment in the field of audio and audiovisual engineering as dealt with by TC 100;
- standards and terminology for ultrasonic techniques dealt with by TC 87.

The scope of ISO TC 43 is:
Standardization in the field of acoustics, including methods of measuring acoustical phenomena, their generation, transmission and reception, and all aspects of their effects on man and his environment. Excluded: electroacoustics and the implementation of specifications of the characteristics of measuring instruments for acoustic purposes.

The scope of ISO TC 108 is:
Standardization in the fields of mechanical vibration and shock and the effects of vibration and shock on humans, machines, vehicles (air, sea, land and rail) and stationary structures, and of the condition monitoring of machines and structures, using multidisciplinary approaches.

Specific areas of current interest include the standardization of:

- terminology and nomenclature in the fields of mechanical vibration, mechanical shock and condition monitoring;
- measurement, analysis and evaluation of vibration and shock, e.g., signal processing methods, structural dynamics analysis methods, transducer and vibration generator calibration methods, etc.;

Table 1

U.S. TAGS administered and organized by ASA	TAG Committees	Associated "S" committees
Electroacoustics	(IEC/TC 29)	S1 and S3
Acoustics	(ISO/TC 43)	S1 and S3
Noise	(ISO/TC 43/SC 1)	S12
Mechanical vibration, shock and condition monitoring	(ISO/TC 108)	S2
Measurement and evaluation of mechanical vibration and shock as applied to machines, vehicles and structures	(ISO/TC 108/SC 2)	S2
Use and calibration of vibration and shock measuring instruments	(ISO/TC 108/SC 3)	S2
Human exposure to mechanical vibration and shock	(ISO/TC 108/SC 4)	S2
Condition monitoring and diagnostics of machines	(ISO/TC 108/SC 5)	S2
Underwater acoustics	(ISO/TC 43/SC 3)	S1, S12, and S3/SC1

- active and passive control methods for vibration and shock, e.g., balancing of machines, isolation, and damping;
- evaluation of the effects of vibration and shock on humans, machines, vehicles (air, sea, land, and rail), stationary structures and sensitive equipment;
- vibration and shock measuring instrumentation, e.g., transducers, vibration generators, signal conditioners, signal analysis instrumentation, and signal acquisition systems;
- measurement methods, instrumentation, data acquisition, processing, presentation, analysis, diagnostics and prognostics, using all measurement variables required for the condition monitoring of machines;
- training and certification of personnel in relevant areas.

The scope of ISO TC 108/SC 5 is:
Standardization of the procedures, processes and equipment requirements uniquely related to the technical activity of condition monitoring and diagnostics of machines in which selected physical parameters associated with an operating machine are periodically or continuously sensed, measured and recorded for the interim purpose of reducing, analyzing, comparing and displaying the data and information so obtained and for the ultimate purpose of using this interim result to support decisions related to the operation and maintenance of the machine.

The scope of ISO TC 43/SC 3 is:
Standardization in the field of underwater acoustics, (including both natural and anthropogenic sound), including methods of measurement and assessment of the generation and propagation of underwater sound and its reflection and scattering in the underwater environment including the seabed and sea surface, and also including all aspects of the effects of underwater sound on marine life and environment.

The ISO secretariats

The standards program operates 3 secretariats on behalf of ANSI for ISO. These secretariats are ISO/TC 108, Mechanical vibration, shock and condition monitoring, TC 108/SC 5, Condition monitoring and diagnostics of machines, and the newly formed TC 43/SC 3, Underwater acoustics. In ISO, the Secretariat nominates the committee or subcommittee chair (George Frisk will be nominated to be the first chair for TC 43/SC 3). This new ISO subcommittee will provide the vehicle for much greater participation in standards by several of the ASA TCs that heretofore have not been greatly involved in standards. These TCs clearly include underwater acoustics, animal bioacoustics, and acoustical oceanography.

Operation of the S committees

Figure 1 illustrates the component parts to the structure of an S committee or subcommittee. The committee includes a chair, a vice chair, voting member organizations, and individual experts. Note that the memberships of these committees are organizations with a direct and material interest in the subject matter of that committee. Organizations include large manufacturers such as John Deere and GM, industry groups such as the Air-conditioning, Heating, and Refrigeration Institute (AHRI), professional societies such as the American Speech-Language-Hearing Association (ASHA), government laboratories and regulatory bodies, universities, consultants, and consumer advocates, etc. These are the organizations that vote. They accomplish their participation by appointing a representative and an alternate to the committee or subcommittee, and these appointed representatives cast their vote and otherwise participate on behalf of the organizations that they represent. Individual experts and others are able to comment on documents, but, ultimately, it is the vote of the membership that determines the outcome of a ballot.

Fig. 1. Committee/subcommittee organization.

The committee is assisted in its operation by various groups. Primary are the working groups which perform the basic work in drafting and revising standards. Working groups are made up of a chair, sometimes a vice chair or co-chair, and a group of technical experts. The working group drafts the standard, but they do not vote on the result. All voting is done by the committee.

Figure 2 illustrates the ANSI standards development process that is used in our S committees. Some of the important points to note are the ballots and the process that surrounds them. The first ballot is for approval of a proposed new work effort. If successful, the new work effort is allocated to an existing WG or to a new WG. The WG develops a draft document, and when the working group chair feels that the document is sufficiently complete, it is transmitted to the committee chair for ballot. If the S committee chair and vice chair concur, the draft standard goes to the membership of the committee for ballot. If during the ballot, there are negative positions by members, experts or others participating in the review, it is the job of the working group chair, sometimes assisted by the working group membership and others, to attempt to resolve the negative positions.

Changes to a draft standard based on valid comments can range from virtually none to very extensive. This great range of changes leads to 3 possible outcomes from ballot. It can be that there are no substantive negative positions. In

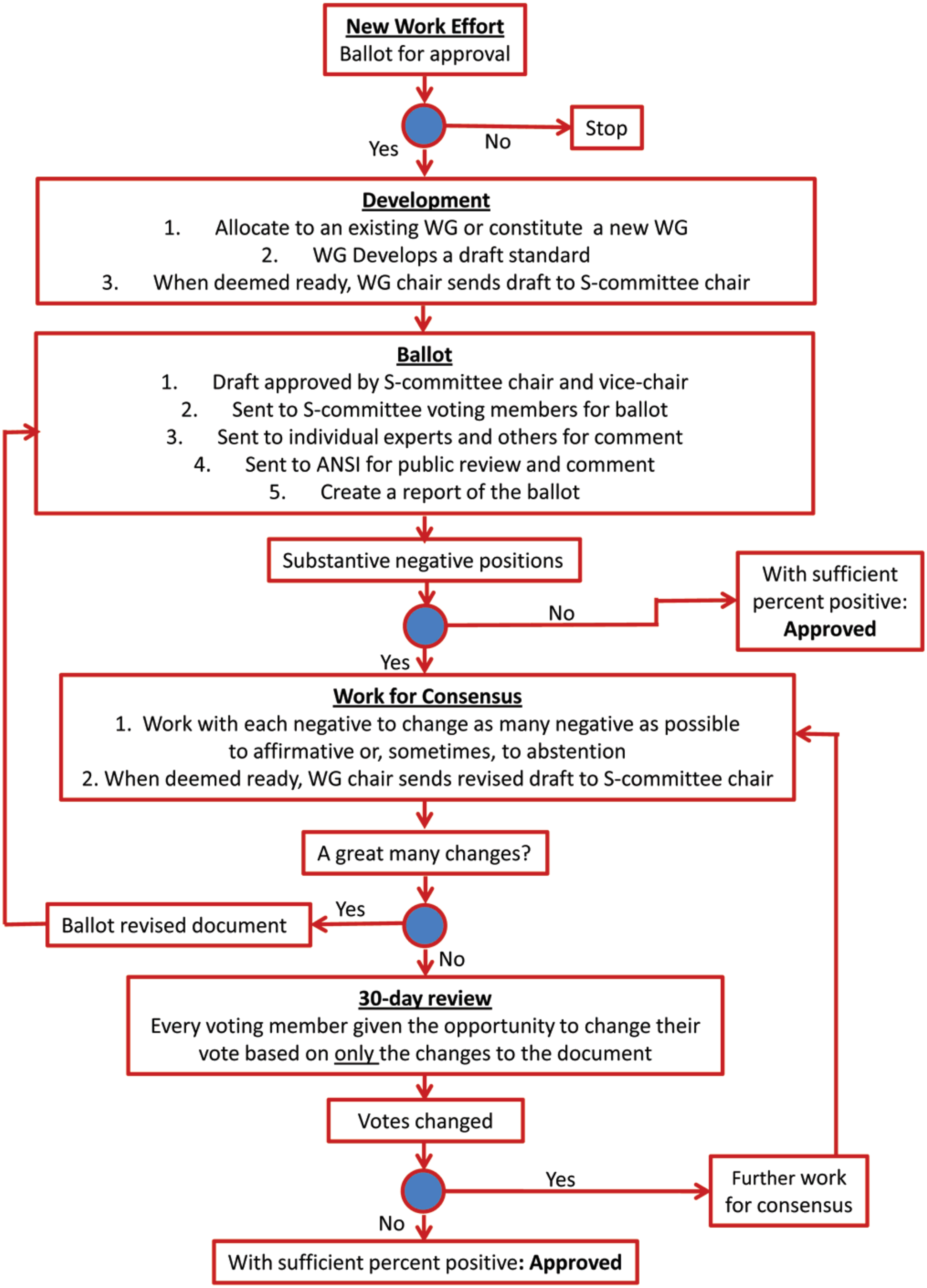

Fig. 2. Detailed standards creation process.

this case the standard is approved as-is with possible editorial corrections. It can be that there are several technical changes that are agreed upon in order to reverse negative positions. In this case, a 30-day review of the suggested changes is conducted. During this 30-day review any member can reverse the positive position based on the changes made. This can lead to more changes and another 30-day review. Sometimes the technical changes are so great that the draft standard is a substantially new document, and a new ballot is conducted.

At about the same time that the ballot is taking place within the S committee, the draft standard is put forward by ANSI for public review and comment. Rarely are such comments received but a response must be made and accommodations as deemed necessary.

The goal is to develop a consensus. A consensus is much more than a plurality. In the case of the standards developed by the ASA, our procedures mandate 80% or greater concurrence, but we strive for, and often achieve, 100% in favor of the standard.

To keep standards up to date and relevant there is also a five-year review and reaffirmation process. Basically, the committee membership is called upon to review the document and to vote as to whether the document should be reaffirmed as is, revised, or rescinded.

The primary documents developed by an S committee are American National Standards. In recent years, there are increasing numbers of nationally adopted international standards (NAIS). When a technical area is too new or controversial for standardization, or a standard is otherwise impractical, there is the option of developing a technical report using the consensus process just discussed in this section. To date, the development of technical reports is very rare, occurring perhaps once per decade.

ASACOS

The Acoustical Society of America Committee on Standards (ASACOS) provides the governance to the standards program. Day-to-day decisions and general policy are developed by the executive committee which includes standards director, the chair and vice chair of ASACOS, and the standards manager. Financial and technical policy are developed, by consensus, by the ASACOS steering committee, which includes the members of the executive committee plus chairs and vice chairs of the S committees and subcommittee. The full ASACOS committee includes the members of the steering committee plus a representative from each technical committee of ASA. This committee reviews the budget, approves the nomination report, provides further technical and policy direction, and provides communications in both directions between the standards program and the respective technical committees.

Summary

In summary, the standards program in ASA has an 82-year history. It was instituted along with the *Journal* and technical meetings soon after the ASA was founded in 1929. With the recent additions of S3/SC 1 and TC 43/SC 3, the standards program now spans almost a full breadth of ASA. The accredited procedures of ANSI that are used by the S committees provide for rigorous, transparent process for the development of standards. Finally, it should be clear that standards are one of the primary ways that the ASA promotes the practical application of acoustics.AT

Paul Schomer and his grandson.

Paul D. Schomer, Standards Director for the ASA, has over 40 years of experience, publications, and patents in the areas of environmental noise and its assessment, human and community response to noise, instrumentation and methodology for the measurement and monitoring of noise, sound propagation, and acoustical measurements of building parameters.

INTERNATIONAL STANDARDS DEVELOPMENT AND THE U.S. TECHNICAL ADVISORY GROUP PROCESS

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As industry becomes increasingly global the importance of international standards increases, as well. How can U.S. companies, government agencies, and other organizations ensure that their voices are heard and their interests are protected? The U.S. Technical Advisory Group (U.S. TAG) is the only avenue for U.S. stakeholders to provide input to technical committees in the International Organization for Standardization and the International Electrotechnical Commission. The Acoustical Society of America (ASA) administers nine of these U.S. TAGs.

"Every standards development project starts when someone identifies a need."

This paper presents an overview of the process by which international standards are developed and explains how U.S. stakeholders, working through the American National Standards Institute and the ASA, can participate in the development of standards on acoustics; bioacoustics; electroacoustics; noise; mechanical vibration, shock and condition monitoring; and most recently, underwater acoustics.

Although there are many organizations that develop standards that are used worldwide—Institute of Electrical and Electronic Engineers (IEEE), ASTM International, ASME, and others—this discussion is limited to standards developed under the auspices of either the International Organization for Standardization (ISO) or the International Electrotechnical Commission (IEC). These two non-governmental and non-treaty organizations are located in Geneva, Switzerland. Although they are separate organizations, they have converged over the years in many ways so that today they follow a common set of operating procedures that are set out in the two Parts of the ISO/IEC Directives,[1,2] which were most recently revised in 2011. However there are still some differences in procedures, so each organization also maintains a Supplement setting out those unique points.[3,4]

The IEC is the older of the two organizations, having been formed in 1906. Its scope of work is limited to electrical and electronic technologies. The ISO was founded in 1947 and its scope encompasses virtually everything that is not covered by the IEC. This distinction is increasingly difficult to define as more and more products and processes are both electronic and mechanical and as ISO ventures into areas that were formerly outside its scope such as customer services, training and qualification of personnel, social responsibility, and others.

What are international standards?

ISO and IEC standards are referred to as "voluntary consensus standards." The use of a standard is generally voluntary; in most cases a user can decide to apply a standard or not to do so. If there is more than one applicable standard, the user may generally elect to choose one over the other. Standards are not laws. However, some standards are referenced in law and may therefore be required for that particular application. The use of a particular standard also may be required by contract or some other agreement.

In ISO and IEC, the term "consensus" is defined in the ISO/IEC Guide 2:2004 as "General agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments. NOTE Consensus need not imply unanimity."[5] In the ISO/IEC process there are many opportunities for stakeholder input and for resolution of objections.

Together, ISO and IEC comprise hundreds of technical committees and subcommittees (TCs and SCs) whose members are countries represented by the national standards body of each country. (The members are referred to as "national member bodies" in ISO and "national committees" in IEC. For convenience, we will use "national member bodies.") There is no opportunity for individuals, corporations, or organizations to participate directly in ISO or IEC.

Each national member body may elect to become a P-member (Participating) or to become an O-member (Observing) of a TC or SC, or may not follow that TC or SC at all. Since P-members have an obligation to participate they are expected to set up a national committee to follow the work of that TC or SC. These are often referred to as "mirror committees." In the U.S. the national mirror committees are called U.S. TAGs.

The role of the American National Standards Institute (ANSI)

Both ISO and IEC operate on a model similar to that of the United Nations—one country, one vote. ANSI is the sole U.S. member body of ISO. The U.S. National Committee (USNC) to the IEC is a division of ANSI.

ANSI contracts with U.S. stakeholders to organize U.S. Technical Advisory Groups for each subject. Those U.S. TAGs tell ANSI or the USNC how to vote.

Participation in the U.S. TAG for a particular ISO or IEC committee is the only avenue for U.S. stakeholders to have a voice in the development of ISO or IEC standards in that committee. All U.S. TAGs are formed in ANSI's name but they are organized, managed and funded by the stakeholder organization.

How does ASA fit in?

Compared to other organizations of its size, ASA has an unusually large role in international standards. ASA administers nine U.S. TAGs:

- Electroacoustics (IEC/TC 29)
- Acoustics (ISO/TC 43)
- Noise (ISO/TC 43/SC 1)
- Underwater acoustics (ISO/TC 43/SC 3)
- Mechanical vibration, shock and condition monitoring (ISO/TC 108)
- Measurement and evaluation of mechanical vibration and shock as applied to machines, vehicles and structures (ISO/TC 108/SC 2)
- Use and calibration of vibration and shock measuring instruments (ISO/TC 108/SC 3)
- Human exposure to mechanical vibration and shock (ISO/TC 108/SC 4)
- Condition monitoring and diagnostics of machines (ISO/TC 108/SC 5)

In addition to organizing and administering these nine U.S. TAGs, ASA also provides the international secretariat for three of the ISO committees:

- Mechanical vibration, shock and condition monitoring (ISO/TC 108)
- Condition monitoring and diagnostics of machines (ISO/TC 108/SC 5)
- Underwater acoustics (ISO/TC 43/SC 3)

Steps in the ISO/IEC standards development process

ISO standards are developed in a series of steps, each strictly limited in regard to the time allocated to complete it. (The longest possible timeframe is 4 years, which is the timeframe referenced in the text below.) By their nature, standards are very practical documents. They are prepared to address a specific issue or problem identified by the people working in the trenches. So every standards development project starts when someone identifies a need.

Figure 1 shows a simplified version of the ISO steps and also the points where the members of the U.S. TAG have input at each step. Figure 2 shows the process used to acquire the U.S. TAG input.

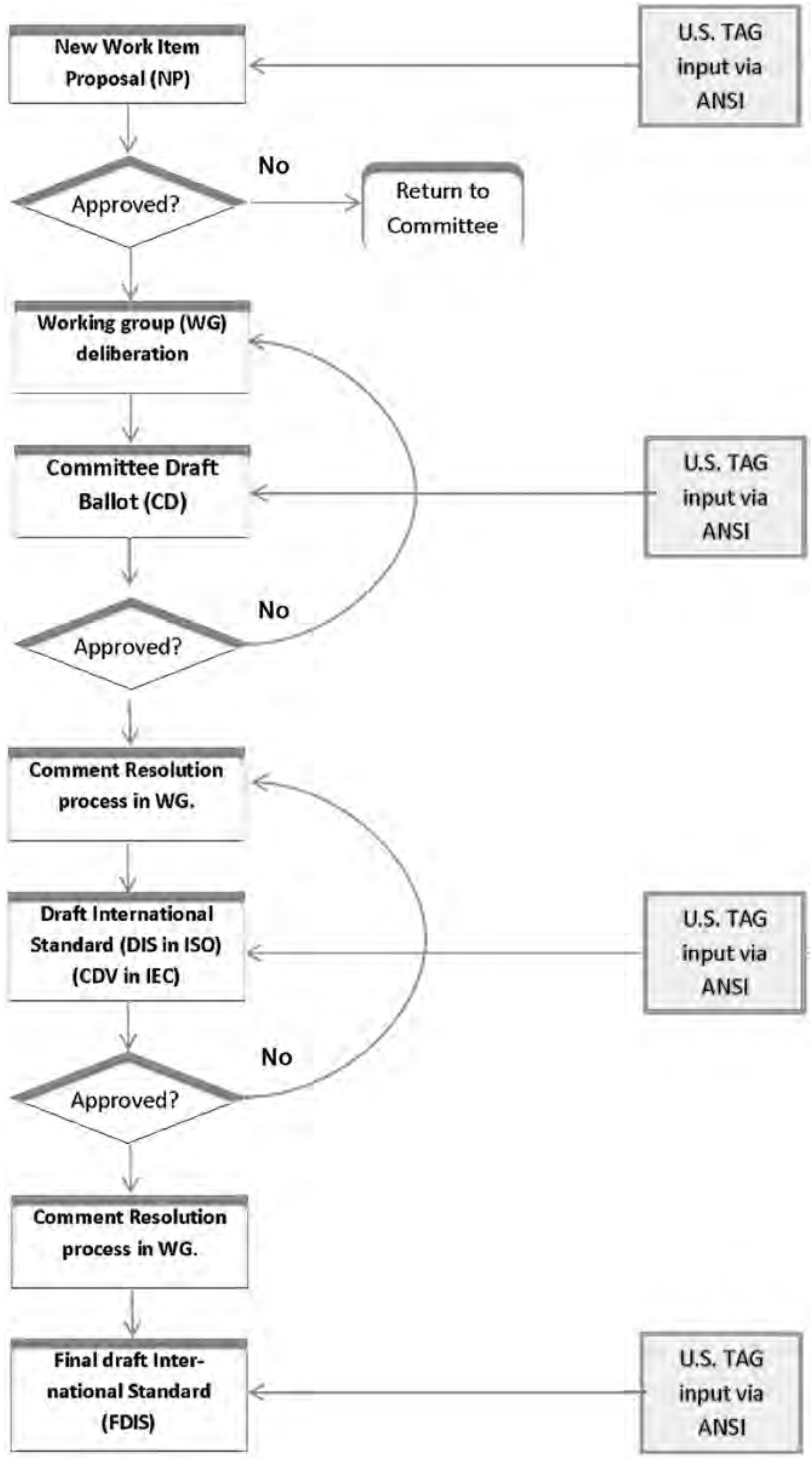

Fig. 1. International Standards Organization/International Electrotechnical Commission (ISO/IEC) standards development process (simplified).

The first step in the ISO process is the “New work item proposal” (NP). The proposal may come from various sources such as any P-member country or from within the committee itself. The key factor is that the idea almost always comes directly from the stakeholder community rather than being imposed “from above” by an outside authority. Whatever the source, the person wishing to make the proposal must complete a form explaining the scope of the project and justifying the need. Issues such as conflict or duplication of pre-existing standards and the potential to develop a “globally relevant solution” to the identified problem are

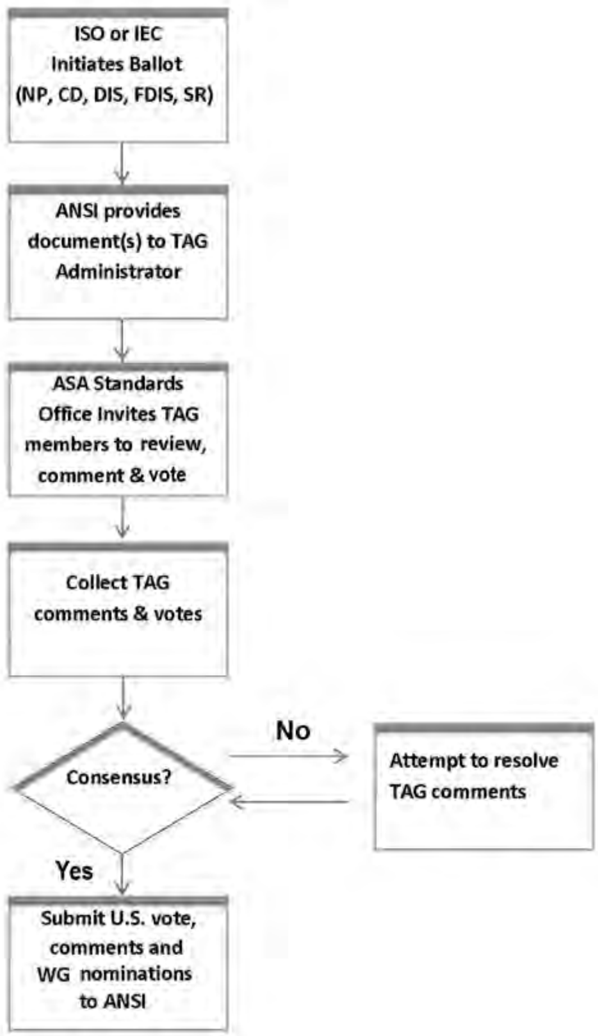

Fig. 2. Process for developing the U.S. position on the International Standards Organization (ISO) or International Electrotechnical Commission (IEC) draft.

addressed. The proposal usually includes a draft, or at the least, an outline of the proposed project. The proposal is balloted, for a three-month voting period, among the national member bodies that participate in or observe that particular technical committee or subcommittee. During this period, each member body conducts national consultations to determine its national vote. At this point, members of the U.S. TAG will be contacted by the ASA Standards office and invited to review and comment on this proposal. Although it is often overlooked, this is a good time for TAG members to submit comments. It is easiest to have a big impact on the final document by making your needs known at the outset—before too many decisions have been made. Approval of the NP requires that it be approved by a simple majority of the members voting and that five of the members agree to participate actively by naming at least one expert to work on the project. These experts form the working group (WG) that will see the project through to the end. Approval of the NP ballot starts the ISO time clock.

Working within the defined scope, the WG iterates a working draft (WD) and continues to work on it until they are satisfied. There is no formal voting in a WG and no requirement for consensus, although failing to achieve consensus in the WG would not bode well for the draft standard when it progresses to the Committee Draft (CD) stage.

When the WG believes the draft is ready for input from a larger audience, it is circulated for voting by the national member bodies of that specific committee or subcommittee as a CD. The CD must be registered for ballot within twelve months from the approval of the new work item proposal. The CD ballot lasts three months. Once again, during this period, each member body conducts national consultations to determine its national vote. The ASA Standards office contacts the members of the U.S. TAG to invite them to review and comment on the draft. You can see that being a member of the TAG allows U.S. stakeholders—even those who cannot participate on the WG directly because of constraints on time or travel—to have a voice in the voting. This is the best time for TAG members to submit substantive comments—the document is mature but still malleable. The CD is approved when, in the judgment of the TC or SC chair, consensus has been achieved. (This is usually considered to require approval by at least 2/3 of the P-members voting, but other factors may also be weighed by the chair.)

The comments that arise from the CD ballot are collated and returned to the WG for consideration. The WG discusses and provides a written response to each comment. (Depending upon the number and nature of the comments, this comment resolution process may be accomplished at a face-to-face meeting, a web or teleconference meeting, or by e-mail.) If a comment is accepted changes usually are made in the draft to address it. The revised draft is prepared for circulation to a wider audience at the Enquiry Stage—called Draft International Standard (DIS) in ISO and Committee Draft for Vote (CDV) in IEC—when it is presented for voting to the entire membership of ISO or IEC for a five-month voting period. The DIS or CDV must be registered within 24 months after approval of the new work item proposal. National consultations are conducted and U.S. TAG members are invited to review and comment. (At this stage, many of the national member bodies will trans-

HOW TO SUCCEED IN STANDARDS WORK

- Know your goals. Focus on what is most important.
- Be willing to compromise where you can. Listen carefully to make sure you understand what is important to others in the group.
- Propose work items that have value to you. Don't wait and hope that someone else will do it.
- Be willing to serve on the Working Group (WG)—better yet volunteer to chair it.
- Attend WG meetings—wherever they are.
- Offer to write text or provide graphics.
- Provide constructive and specific comments and input.
- Provide input at the beginning of the process.

late the draft into their native language to facilitate their national consultations.) TAG members may still submit technical comments but it is much harder to make major changes at this point. Approval requires affirmative votes by 2/3 of the P-members voting and that less than 25% of the total votes cast are negative.

Comments are again collated and returned to the WG for consideration. Comment resolution follows the same pattern as at the CD stage—each comment is reviewed and corresponding changes may be made to the document. It is unlikely that any major changes will be accepted at this point.

The revised Final Draft International Standard (FDIS) is prepared and submitted to ISO for the Approval Stage. This is a two-month ballot conducted among the full ISO or IEC membership. National consultations are conducted again and, once again, the U.S. TAG members are invited to review the final draft. Unless a country is casting a negative vote, no more technical comments may be submitted—only minor editorial comments can be addressed. This is a straight "yes or no" vote and approval requires affirmative votes by 2/3 of the P-members voting and that less than 25% of the total votes cast are negative. The FDIS must be registered within 43 months after approval of the new work item proposal. As soon as possible after the completion of the voting, the document is published.

Every five years after publication, each standard is subjected to Systematic Review (SR), whereby the national member bodies review the document and assess its market penetration and continued relevance. The standard may be confirmed for another five-year period or the committee may decide to revise or withdraw it.

The role of the U.S. TAG is an important one for U.S. parties with an interest in the standards under development. At each voting stage, the availability of the document is announced to the U.S. TAG members so that they can review the document, discuss it with colleagues and co-workers, assess its potential impact on their business, and submit their comments. The benefits are obvious for TAG members who are not active on the WG. However TAG members who are on the international WG are encouraged to participate in forming the U.S. position so that their input is part of the official U.S. position. (See Fig. 2.)

U.S. TAG membership and benefits

For the U.S. TAGs administered by ASA, the TAG members are organizations (companies, government agencies, associations and professional societies, academic groups, etc.). The U.S. TAGs strive to be diversified and represent all stakeholders. Membership is open to all organizations with "direct and material interest." The U.S. TAG members pay a fee to ASA that helps offset about one-half of ASA's costs to administer the U.S. TAG. (Members of the U.S. TAG to IEC/TC 29 will also be assessed an additional fee by the USNC to the IEC.) The ASA has a sliding-scale fee schedule that varies by the type and size of the organization and the number of TAGs (or national standards committees) it joins. Membership in a U.S. TAG is unrelated to any person's individual membership in ASA.

Each U.S. TAG member organization appoints a person to vote and comment on its behalf. On any given U.S. TAG action, each member should submit one unified set of comments and one vote. The voting representative may consult with other experts in that company or organization to decide how to vote, but they have only one vote. Another important function of the U.S. TAG is that it provides the pool of experts who may be appointed to ISO/IEC WGs.

Summary

It is clear that there are many benefits gained from U.S. TAG membership and active participation in the development of international standards.

- U.S. TAG members have multiple opportunities to influence the content of a standard that they will use.
- U.S. TAG members are able to monitor the activity of the committee to gain advance intelligence about plans for future changes to a standard. It is always better to be proactive than reactive.
- Participation allows U.S. TAG members to ensure that their products can be exported worldwide.
- International Standards are often used in support of, or in place of, government regulation. Particularly in the case of foreign governments, U.S. TAG members would not generally have any voice in shaping these regulations.
- Participation in the U.S. TAG shows that your company or organization is a leader in your field.
- And, of course, participation offers a great opportunity to network with other experts in your field.

Visit www.standardsboostbusiness.org to see case studies and learn more about the value of direct participation in the development of International Standards that affect your business or organization.**AT**

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5 ISO/IEC Guide 2: 2004 Standardization and related activities—General vocabulary.

Susan Blaeser has served as Standards Manager of the Acoustical Society of America since 2001. In this capacity, she is the Secretary to four American National Standards Institute (ANSI) ANSI-Accredited Standards Committees (ASC)—ASC S1 Acoustics; ASC S2 Mechanical Vibration and Shock, ASC S3 Bioacoustics, including its sub-committee (SC)—SC 1, Animal Bioacoustics; and S12 Noise. She is also Secretary to three International Standards committees in the International Organization for Standardization (ISO)—ISO/TC 108 Mechanical vibration and shock; ISO/TC 108/SC 5 Condition monitoring and diagnostics of machines and the newly-formed ISO/TC 43/SC 3, Underwater acoustics. Finally, she administers eight ANSI-Accredited U.S. Technical Advisory Groups (U.S. TAGs) to ISO committees and one U.S. TAG for the International Electrotechnical Commission (IEC). The ASA national standards program involves the participation of approximately 500 volunteers, while the international committees include nearly 200 volunteers. As Standards Manager, Susan is actively involved in the work of the committees, supports some 100 working groups, edits the standards produced by these committees, manages the office staff, and oversees the publication and sales program for American National Standards developed by these committees. Prior to working for ASA, she spent many years in non-profit management positions including serving as Managing Director for a regional charity and as Village Clerk-Treasurer for a New York State municipality. She is a summa cum laude graduate of Stony Brook University.

CONSENSUS STANDARDS: ONE PERSPECTIVE FROM A GOVERNMENT SCIENTIST

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Noise regulations

Many of the Federal government's acoustics regulations have been directed toward abating environmental noise. The Noise Control Act of 1972 designated the U. S. Environmental Protection Agency (EPA) as the principal agency for leading Federal noise control efforts, and EPA's primary tool was to be through its regulatory authority.

Regulating noise sources requires not only designating a maximum acceptable sound level but also specifying the measurement protocol. The measurement protocol addresses such issues as measurement geometry, atmospheric conditions, acoustical properties of pavement and ground surfaces, ambient level, spatial and temporal sampling rates and instrument specifications. Because the development of measurement protocols is the focus of consensus standards activities, EPA participated in the activities of consensus standards organizations However, the EPA Noise Office developed its own measurement protocols—a measurement process that proved lengthy and contentious. Frequently, it was the measurement protocol that was challenged, delaying the issuance of regulations.

"Had the National Technology Transfer Act been in effect during the 1970s when EPA was developing noise regulations, EPA could have issued these regulations in a more timely manner using less resources."

National Technology Transfer and Advancement Act of 1995

Had the National Technology Transfer and Advancement Act of 1995 (Act) been in effect during the 1970s when EPA was developing noise regulations, EPA could have issued these regulations in a more timely manner using less resources. Rather than develop its own measurement protocols, EPA would have adopted consensus standards, because the Act requires that government agencies use voluntary consensus standards in regulating industries or procuring services or products in lieu of government-unique standards, except where inconsistent with law or otherwise impractical.

The Act has several goals:

- Provide incentives to establish standards that serve national needs.
- Eliminate the cost to the government of developing its own standards.
- Promote long-term growth for U.S. enterprises and promote efficiency and economic growth.
- Further the policy of relying on the private sector.

The applicable section of the Act resulted from private-sector concerns over reducing the inefficiency of developing government standards when such standards already existed in or could be developed by the private sector. Government interests in fairness are addressed in that consensus standards are required to be open, contain a balance of interests and employ due process.

Federal agencies are required to report to the Office of Management and Budget (OMB) if a government-unique standard is used in lieu of consensus standards and the rationale for doing so. OMB is required to report annually to Congress on such deviations.

U.S. Department of Transportation

A cursory look at the U.S. Department of Transportation's (DOT) standardization activities showed that DOT agencies have turned to the consensus standards communities for the development of noise measurement protocols. Some examples within the Department relating to aviation, highways and railroads are given.

The Federal Aviation Administration (FAA) is developing procedures for calculating aircraft emissions, estimating aircraft thrust, measuring gas turbine engine noise and applying atmospheric absorption to one-third octave-band data. The Society of Automotive Engineers International (SAE), a consensus standards organization, is developing the procedures.

Visually handicapped individuals and other pedestrians may not be able to hear electric and hybrid vehicles when these vehicles are stopped or moving slowly. The Pedestrian Enhancement Safety Act of 2010 requires the National Highway Traffic Safety Administration (NHTSA) to develop performance requirements for an alert system that allows detection of a nearby electric or hybrid vehicle. That law also requires NHTSA to consult with SAE, the International Organization for Standardization (ISO) and others. SAE and ISO are now developing a test procedure for measuring minimum vehicle noise emissions that are audible.

The Federal Railroad Administration (FRA) requires that railroads test horns on locomotives built before September 16, 2006 to verify that they meet a certain acoustic criterion. Because the measurement protocol requires outdoor testing, one commuter railroad had concerns over ensuring that the test site has sufficient space for meeting the test site requirement of having no noise reflective planes within 200 feet and being able to carry out tests without causing noise pollution from the sounding of the horns to the neighbors of the test site. There were also logistical problems of moving locomotives to the test site from branches on which different propulsion methods are used.

At the railroad's request, an American National Standards Institute (ANSI) Noise Committee working group developed an *ex-situ* standard for testing the horns in a hemi-anechoic chamber. After the working group completed its work and the ANSI Noise Standards Group approved the standard, the standard was published. The railroad then requested a waiver to test under the new standard, which FRA granted. As a result, the railroad can test its horns in an efficient manner that will ensure that horns emit a signal of sufficient intensity to warn the public and without the test polluting the environment.

At DOT, there is a strong participation in the voluntary consensus standards process. In 1996, the year the Act was signed into law, DOT issued 110 government-unique standards. In 2009, the number of DOT regulations referencing government unique-standards was only eight. DOT is a strong participant in consensus standards working groups—its employees were represented on 50 standards-developing organizations and 238 committees in 2009.**AT**

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TOWER OF BABEL, OR WHY BOTHER ABOUT INTERNATIONAL STANDARDS?

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When Paul Schomer and Susan Blaeser invited me to present a paper in the special session *Demystifying Standards* at the 162nd Meeting of the Acoustical Society of America in San Diego, November 2011, I decided to take the title of the session rather literally. I asked myself, "What exactly is the mystery of standards?" Paul and Susan asked me to take a non-U.S. point of view on this question. As I started to draft the abstract of my paper, a number of thoughts ran through my mind. This article presents those fragmented thoughts and tries to tie them together.

> *"Whereas the question in the USA is how to bring American standards to the international level, the process in Sweden is most often the reverse."*

Standardization helps to solve common problems

A first thought that occurred to me was that, to my knowledge, there are no voluntary consensus standards in my own field of research—psychology. That is, there are no standardized methods that a group of psychologists have developed together, and with which they agreed to comply. The closest thing to a standard in psychology is psychological tests, like the inkblot (Rorschach) test, which are used and interpreted by a standardized procedure. However, these psychological tests are typically developed by an individual inventor with a vision, who acquires a number of followers who share the inventor's view.

Another example is personality tests. In this field, researchers, individually, have reached a common understanding on what the fundamental dimensions of a personality are, but all have developed their own method of measuring these dimensions.

It seems that tradition provides that academic psychologists are supposed to compete for top positions—who is the cleverest amongst us all?—and never collaborate to solve common problems (God forbid that someone steals my clever ideas.) On the other hand, solving common problems presupposes that we are able to agree on what they are. Perhaps there is some truth in the claim that "engineers like to solve problems, whereas psychologists only like to discuss them."

Standardization is like speaking a common language

As I was writing the abstract of my paper, I realized that I was writing it in English. Well, this makes sense, because I was writing an abstract to an American conference. Nevertheless, I am Swedish. Would it not make more sense if I write in Swedish?

To illustrate my point, I presented the audience in the conference with a photograph of a chair (from IKEA), and asked the audience to name the object. Hardly surprising, the audience agreed that the photograph depicted a chair. I then asked the audience if I would be wrong if I decided to call the object "Tuoli," "Sedia," "Chaise," "Silla," or "Stol." Again the audience agreed (this time) that I would be allowed to use any of these words to name the object, because they are all the different names of the object in different languages.

Language serves as an excellent illustration of what standardization is all about. This leads me to the title of my paper: *Tower of Babel*. According to the legend of the tower of Babel in the first book of Genesis in the Bible, man decided to build a tower high enough to reach heaven. God found this to be a bad idea, and punished mankind by giving us different languages, so we would not be able to communicate and collaborate. This strikes me as the opposite of standardization.

The legend of the Tower of Babel teaches us that standardization provides us a common point of reference and means for communication. Standards facilitate the development of common objectives, common methods and a common understanding. To overcome the problem of speaking different languages, throughout history, people have decided on a common language for international exchange. For us, this is English, which provides me the opportunity to write this paper, and to convey my thoughts, to an international audience.

Standardization promotes (international) collaboration

I live in Sweden, a small country located in northern Europe. Despite the relatively large surface—approximately 1.8 times the size of the United Kingdom—Sweden has a population of only 9.4 million citizens (compared to 62 million in the UK). Such a small population is unable to sustain itself without international exchange.

Sweden has been involved in international trade since long before the days of the Vikings. The vast amount of Roman silver coins hidden in the Swedish soil speaks a clear message to the archeologists. The name Viking is synonymous with international trade, and basically means "to explore." The Scandinavian Vikings traveled all over the world as they knew it—from Turkey (by the Mediterranean Sea), and across the Atlantic Ocean to North America—long before Columbus.

Sweden still depends on international trade today, and international standards are an important part of this exchange. Whereas the question in the USA is how to bring American standards to the international level, the process in Sweden is most often the reverse.

There is very little reason for a small country like Sweden to develop standards that are unique to us. When the members of Technical Committee 110—Acoustics and Noise—of the Swedish Standards Institute (SIS) consider proposing a new standard, we first ask if there is any possibility to propose this new idea to the International Organization for Standardization (ISO). If the proposal is successful and leads to an International Standard, we would later ask if we also would like this new standard to be a Swedish Standard. Those of us in Technical Committee 110 of SIS who are project leaders are all conveners of a working group of Technical Committee 43 of ISO. There are no uniquely Swedish standardization projects in acoustics. That would only be a waste of time.

International Standards expand our horizons

Like English as an international business language, International Standards provide us a common frame of reference that facilitates exchange and collaboration beyond our national borders. Could you imagine humanity and a global economy without these common frames of reference?**AT**

Östen Axelsson is an environmental psychologist and photographer. He obtained his PhD degree in psychology from Stockholm University, Sweden, on his doctoral thesis "Aesthetic Appreciation Explicated." In acoustics, Dr. Axelsson is most known for his research on soundscape, and as the convener of the working group ISO/TC 43/SC 1/WG 54 "Perceptual assessment of soundscape quality" of the International Organization for Standardization (ISO).

TAKING AMERICAN NATIONAL STANDARDS TO THE INTERNATIONAL LEVEL

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Once you have led a group of national experts on the creation of the first commercial standard for the measurement of underwater noise from ships, what do you do next? First, you celebrate that you got the job done and make sure everyone knows that it is not just a "commercial standard," but more correctly, the first "voluntary consensus standard."

"Unlike Super Bowl winning teams, standards committees are not offered paid trips to Disney World..."

Until the formation of Working Group 47 under the Acoustical Society of America's (ASA) S12 committee on Noise, no one was talking about standardizing a method for the source level measurement of a ship's underwater noise signature.

It took about four years for the working group's efforts to be realized with the issue of American National Standards Institute/Acoustical Society of America (ANSI/ASA) S12.64-2009/Part 1, *American National Standard, Quantities and Procedures for Description and Measurement of Underwater Sound from Ships- Part 1: General Requirements*. This author was given an opportunity to write about the technical details of the standard in the October 2009 issue of Acoustics Today. Briefly, the standard provides a description of the methodology, instrumentation, and data processing to quantify an "affected source level" measured using

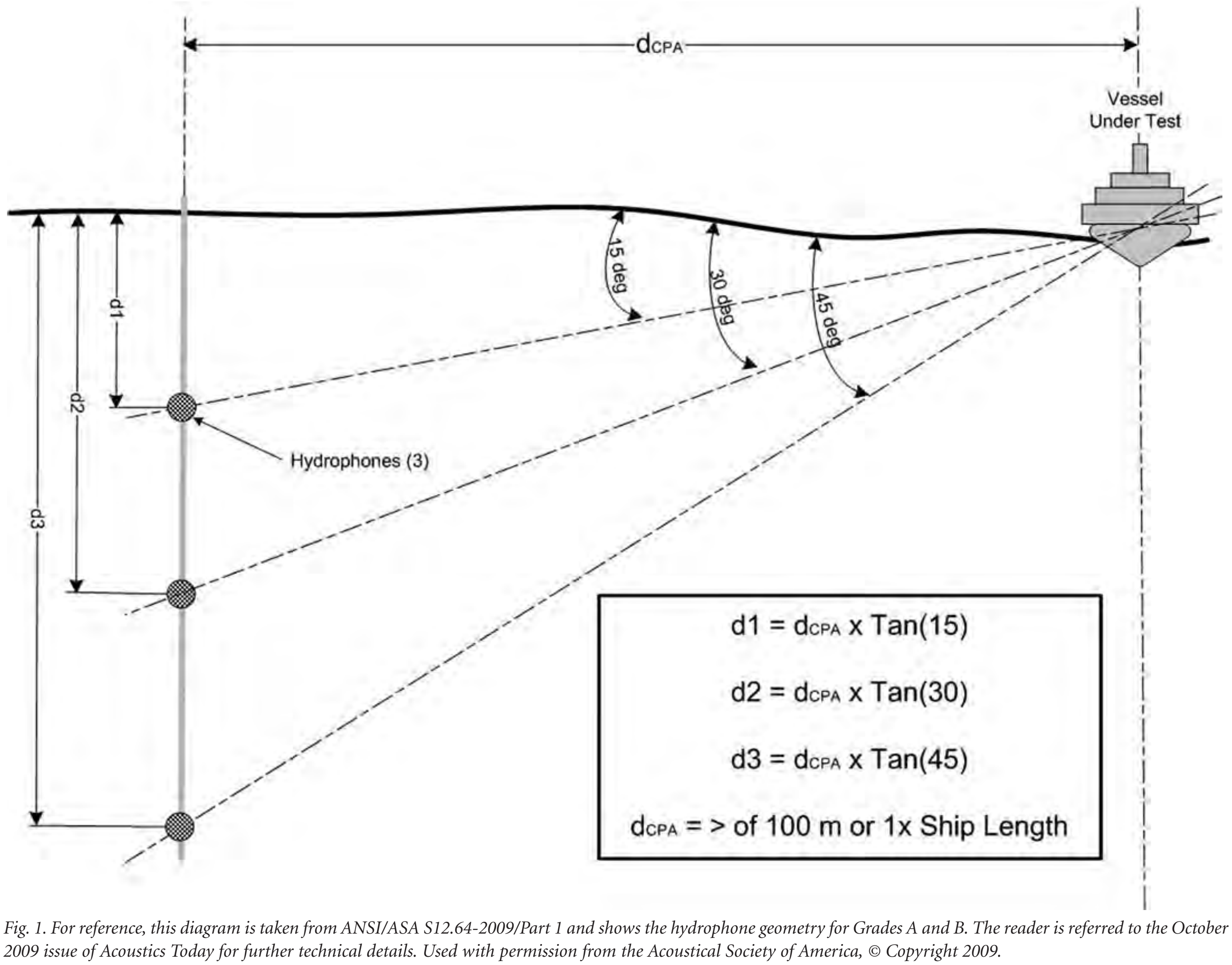

Fig. 1. For reference, this diagram is taken from ANSI/ASA S12.64-2009/Part 1 and shows the hydrophone geometry for Grades A and B. The reader is referred to the October 2009 issue of Acoustics Today for further technical details. Used with permission from the Acoustical Society of America, © Copyright 2009.

Fig. 2. Map of North America showing both U.S. and Canadian underwater noise testing facilities and ranges operated by the U.S. Navy and the Canadian Navy.

hydrophones. The results are reported in sound pressure level (SPL) relative to one micro-Pa, normalized to a distance of one meter in one-third octave bands. The standard provides a description of the measurement process and not a specific tool or device. The standard has three Grades, A, B & C, which are intended for precision, engineering and survey measurements, respectively. Figure 1 shows the configuration of the overall measurement scheme for Grades A and B.

Fortunately, this article is not about the technical details of how to measure underwater noise from ships, but it is about the standardization process. More specifically, it is about what can happen after the development of an American National Standard. Unlike Super Bowl winning teams, standard's committees are not offered paid trips to Disney World upon the completion of their work. The chair is given a very nice plaque to signify the hard work, even though he could not do it without a dedicated committee of experts from the private sector, government agencies and academia. For example, the members of the ANSI/ASA S12/WG 47 that created ANSI/ASA S12.64/Part 1 came from the Naval Sea Systems Command (NAVSEA), Naval Surface Warfare Center (NSWC) and National Oceanic and Atmospheric Administration (NOAA); academia including members from University of Delaware, Lamont-Doherty Earth Observatory, Florida Atlantic University, University of Rhode Island and University of New Hampshire; and industry including private consultants to Fortune-500 companies. The topic was of such interest that there was international participation, from Canada, United Kingdom, the Netherlands and Australia.

Back to the question—after developing an ANSI accredited standard what do you do for an encore? The only logical follow-up is to bring the standard to the International Standards Organization (ISO) and that is just what was done with the encouragement and help of the ASA standards office. This office, with limited staff, manages standards development, maintenance, sales and distribution for all topics in acoustics, noise, vibration, bioacoustics and now underwater noise. This includes such differing topics such as sound power from computer equipment to classroom acoustics, and now underwater noise from ships.

This author assumes that standards move from the national arena to the international stage all the time. Likewise ASA receives international standards (from ISO) and then adopts them as ANSI/ASA standards. Even without creating new methodology, the process of adopting standards nationally and internationally requires a significant amount of paperwork, technical review and member balloting. All of this work is managed by the ASA standards office. The toughest part of their job is keeping all the volunteer participants (the author) engaged in their standards work without the military's practice of promoting, the private sector's cash/stock bonuses, or academia's practice of bestowing tenure.

By now the reader may wonder why bother with all this effort? Why do we even need ANSI or ISO standards? That question is answered by just a couple of simple examples. Just recently, the author found great difficulty attaching a box-type ski rack to second vehicle without the use of a pricey adaptor. This lack of car rack standardization brings to mind, a similar difficulty replacing a car's windshield wiper. Remember Beta and VHS video tapes? The ASA Standards office mentioned, that the Beta/VHS "issue was really one of competing standards. They were both heavily standardized and it was a matter of which one won out in the marketplace." Actually, the Beta format was better than the VHS, the winner.

Imagine all the extra work and money that goes into creating multiple adaptors, windshield wipers, and two different video tape formats. It is unfortunate that standards groups were not started when the world became electrified. If so, we would all have one type of electrical socket. The only negative is that travel stores would not be able to sell power adaptors/convertors when landing abroad without ability to recharge your electronic devices.

If global uniformity did not occur for power outlets, automobiles, or the early digital entertainment industry, why is it necessary for sound and vibration? Why is it so important for underwater noise? Since electrification (1920's) and establishment of home entertainment (1970's), the world has gotten to be a lot smaller place in which we can interact with people in any corner of the world. Today we still have failure of standardization— PC vs. Mac. Even the core of our technical world, the units system, is not unified. How many feet is one meter?

Certainly, we could live without a standard method for measuring ship noise, but wouldn't uniformity be better? For the case of the first ANSI/ASA working group on underwater noise, the need for such a standard came from the author's involvement in design, construction and testing of quiet research vessels starting around 2001. Europe had been building such quiet ships since 1995. Efforts got started in the U.S. with the design and construction of a new class of quiet fisheries research vessels for the U.S. Department of the Interior, National Oceanic and Atmospheric Administration (NOAA). The first of the Class, the *OSCAR DYSON* was put into service around 2004. Since then three more vessels were put into service with many more quiet ships on the way.

Without a standard, the only way to get an accurate measure of a ship's underwater noise was to go to a naval facility. Since World War II the field of underwater acoustics has been the sole concern of the navies of the world, who have used this special knowledge to hide their submarines while in the hunt for enemy combatants. In the United States, this need resulted in the establishment of numerous ocean range facilities for measurement of underwater noise. Unfortunately, both U.S. and Canadian facilities are located in the corners of North America. Figure 2 shows the location of the major U.S. and Canadian facilities for measurement of underwater noise. These facilities are available for "private party" work, but at significant cost for facility usage and travel expenses for both fuel and manpower to crew ships to travel to one of the four corners. This works for the Navy, but it is not economically feasible for industry. Hopefully, the ANSI standard solved this problem by offering uniform methodology that did not require a "fixed range facility."

In the author's opinion the rest of the world has the same problem. The first underwater noise Working Group within the ASA had a large international participation, mostly from Europe. Low-noise ships are being designed and built in many of the continents, particularly Europe, Asia, North America, and Australia. Balloting of the proposed work to create an ISO standard was met with broad interest. To be approved, the proposal must be accepted by a simple majority of the voters of the committee and only five member bodies (i.e., countries) need to agree to participate in the development of a new standard. Nine countries elected to participate in this one, with two additional countries signing on after work had commenced.

The ISO version of an underwater noise standard began at a meeting in London in April 2011. The first meeting was attended by nine participants representing Germany, the Netherlands, Denmark, Norway, United Kingdom and the USA. Thus, Working Group 55 under Sub-Committee 1 (noise) which is part of Technical Committee 43 (acoustics) was formed. The shorthand designation is TC 43/SC 1/WG 55. Since the first meeting, WG 55 has become a "United Nations" representation with members from Australia, Canada, Denmark, Germany, Japan, Mexico, Netherlands, Norway, Russia, United Kingdom, and the USA. There are twenty-one people on the working group representing those 11 national member bodies. This is quite a large committee for a standards working group.

This is an excellent place to compare one of the major differences about operating under the national ANSI guidelines versus the ISO guidelines—membership. Working under ANSI, anyone can become a member of the standards working group, but within ISO you must be nominated by your country's member body. In the U.S., the member body is ANSI, American National Standards Institute, which works through the ASA for topics related to acoustics and vibration. Other member bodies are British Standards Institute (BSI) in the UK; Deutsches Institut für Normung (DIN) in Germany; and Standards Council of Canada (SCC) in Canada.

A pleasant surprise working within ISO is that the organization provides a set of web tools for the chair and the committee. The most useful is the availability of a web meeting account. This is very helpful in keeping the committee efforts moving forward. ANSI does not provide such support unless funding is provided by private parties. For ISO Working Group 55, the web meeting has become an indispensable tool. It allows telephone connection of everyone by land line or voice over internet protocol (VOIP). It allows display of the agenda and other relevant visual information on the user's computer screen. With this group, we have had as many as ten committee members on a web meeting at once.

One important issue for international web meetings is selecting a time during which most committee members can "attend" the meeting. The best time to include the East and

West coasts of the United States and Europe is 10 to 11 am (EST) To the far west, this is 7 to 8 am (PST) which is a reasonable time to be awake. To the east, in continental Europe this is 4 to 5 pm local time. Obviously, this is not the entire planet. Each committee may have different members in different geographic locations, and will have to adjust the meeting times accordingly.

This author thinks that the web service works best once the committee members have gotten to know each other and can recognize voices and understand accents. This brings up the issue of language. ISO standards are printed in English and French. In ISO/TC 43, ISO meetings and business are typically conducted in English, lucky for those of us in English-speaking countries (U.S., UK, and Australia). Most of the participants speak excellent English which makes for fairly easy communication. The author believes that it is a good practice not to assume all committee members can follow every discussion at the same speed. This author gives everyone more than one chance to ask questions and make position statements.

Email is also possible for some limited "discussions" between the committee. However, there are a couple of problems—losing track of the thought-train, especially when a committee member responds late or out of sequence of "the discussion." It is helpful when the chair poses questions for members to provide opinion without introducing new discussion topics.

As for physical meetings, it is probably obvious that these are much easier to schedule when everyone is coming from the same country. ISO meetings can be scheduled anytime and any place, but out of courtesy to the worldwide membership, 4 months' advance notice is usually given. Also, it is a good practice to keep meeting locations close to major airports.

What else keeps ISO as well as ANSI standards committees operating? Most important is people. Standards committees need people, people, and people. This activity cannot and should not be done by one or two experts. This is even more important in the case of an international arena. As with anything, financial resources are also helpful. However, if the author was offered twenty people or twenty thousand dollars, he would take the twenty people. On the other hand, standards committees can certainly get too large. A good size is between 10 to 15 people with no greater than 25 members.

It is the chairman's, or in the case of ISO convener's job to keep the group on track during committee meetings. The interesting issue with ship noise measurements was that every aspect was related to every other aspect. For example, a discussion of instrument bandwidth eventually leads to discussion of Doppler shift error and ship speed. It is helpful to keep the committee focused on the first topic. It is also important for the convener to delegate work and not take on all efforts. This author has followed the rule that if you suggest the idea, you must work on the idea. As with any volunteer effort it is important to thank everyone regularly!

With that said, this author thanks all the committee members of the Working Group 47 under the ANSI/ASA S12 committee on noise. The author also thanks the current ISO Working Group 55 for their continued efforts.**AT**

The author with his two daughters, "in-command" of the USS ALBACORE, a pre-nuclear era submarine now located in Portsmouth, New Hampshire. It was the first navy-designed vessel with a true submarine (teardrop) hull form. The ALBACORE was used as a test-bed for many technologies including many quieting techniques used by the author on the design of quiet research vessels. In was commissioned in 1953 and designated a mechanical engineering landmark in 2000 by the American Society of Mechanical Engineers (ASME).

Michael Bahtiarian has worked in the field of marine noise control for most of his 26-year career which started at General Dynamics Electric Boat Division. He is currently the Vice President of Noise Control Engineering, Inc. in Billerica, Massachuetts, which specializes in shipboard noise and vibration control. Michael is also a Board Certified member of the Institute of Noise Control Engineering (INCE) and holds a B.S. in Mechanical Engineering from Penn State University and a M.S. in Mechanical Engineering from Rensselaer Polytechnic Institute. Michael is the chairman of the Acoustical Society of America (ASA) Working Group 47 which produced American National Standards Institute/Acoustical Society of America (ANSI/ASA) S12.64/Part 1. He is now the convener of Technical Committee 43/sub-committee 1/ Working Group 55 (TC 43/SC 1/WG 55). He has completed numerous shipboard noise control projects most notably the National Oceanic and Atmospheric Administration (NOAA) Fisheries Research Vessel (FRV-40) and the *R/V HUGH R. SHARP*, a quiet research vessel for the University of Delaware. He is currently involved in other quiet-ship designs including the Ocean Class AGOR Oceanographic Research Vessel and the Arctic Region Research Vessel (ARRV) for the University of Alaska at Fairbanks.

ACOUSTICAL STANDARDS PLAY A KEY ROLE IN OPTIMIZED SOLUTIONS

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Acoustical standards are important to heating, ventilation, and air conditioning (HVAC) system manufacturers. Our participation in developing standards helps us by:

1. getting the right information to our customers;
2. avoiding conflicts between manufacturers and other organizations; and
3. preparing for changing system requirements.

"Providing accurate, appropriate acoustical information for our systems helps ensure that the solutions are applied correctly."

Getting the right information to customers

Our company's mission is to provide safe, comfortable, and efficient environments. Part of the comfort offering includes appropriate acoustical conditions such as sound levels that are due to system operation. Customers that specify acoustics as a design parameter range from those with very little exposure to those who are very knowledgeable acoustical professionals. To apply our systems correctly, information needs to be provided about our solutions. However various customers ask for different information.

Some customers desire information about sound power levels while some want information about sound pressure levels. Different frequency ranges are often requested. Some demand single number descriptors and some want data presented in one-third octave bands. It takes time to convince customers that the values we publish are correct, educate them on what the information means and show them how it can be used in their application. Standards help to determine what information needs to be published and how to collect that information. Some standards educate the users about what is included in the standard, why it matters, and how accurate or repeatable the tests are that determine published values.

In general, our industry prefers to provide sound power levels since it is a direct output of the systems. Sound pressure is usually controlled by factors beyond our control. We have to undertake a very large number of measurements to adequately describe our solutions, so the measurements need to be fast. Our systems are often large and generate significant levels of low frequency sound. The information we provide needs to be used by customers to design spaces that meet the acoustical requirements, without excessive controls, so it must be accurate.

Customers who have experienced untested systems and the headaches they may create have demanded check tests, so our measurements must be repeatable. To use our published information in the design process, either octave band or one-third octave band levels are needed. We have found that using qualified reverberation rooms to determine sound power meets these requirements. Furthermore, having standardized sound measurements allows for comparisons between different manufacturer's systems. (See Fig. 1)

Fig.1. Qualified reverberation room with system ready for sound power measurements.

In the 1960s and 1970s, reverberation room standards[1] were developed with considerable input from the HVAC and computer industries. The equipment specific standards have been undergoing improvements ever since.

As new methods and systems become available, the standards evolve. Those who write the standards are influenced significantly by the problems they face. Those who focus on small easily movable devices that primarily emit high frequency noise have different perspectives than those with large systems that cannot easily be moved and generate low frequency sound.

During the 1980s and 1990s, the HVAC industry focused on system specific standards through the Air Conditioning, Heating, and Refrigeration Institute (AHRI), and reduced our activities at the Acoustical Society of America (ASA) and at the International Standards Organization (ISO). Thus, the base sound power standards moved away from addressing our needs.

Those present at the ASA or ISO standards activities often worked on computers or small appliances and tools that have different constraints and attributes. AHRI is currently working with the S12 Noise standards committee to create a new reverberation room standard that addresses the concerns and needs of HVAC manufacturers. We are spending more time now because we neglected this group for too long.

Avoiding conflict

During the 1990s the importance of acoustics of classrooms received much attention within the acoustical community. (See Fig. 2) Research was started or expanded, working groups were formed, and a standard was written to determine the requirements regarding acoustics of classrooms.[2] The HVAC industry was not actively involved. We were on the working group mailing lists; however, the effort did not get the attention it needed and we were surprised when the standard neared completion.

The result was a negative reaction to the big changes in requirements. Had we been active, we would have been aware and ready for the changes, and we would have understood why they were needed. The reaction resulted in hard feelings and mistrust between the HVAC industry and many in the acoustics community. There was significant time and money spent by both sides to defend their respective positions.

In 2009 and 2010, the standard was revised.[3] This time, the HVAC industry was actively involved (working group co-chairs: Stephen Lind and Paul Schomer). We were able to bring the people involved together to understand better why the standard was important. Many people in the HVAC industry were educated on the requirements and the reasons behind them and subsequently moved from being opposed to the standard to a neutral position (with some companies strongly supporting the standard). The cost in time, dollars, and goodwill was much lower because of the collaboration.

Fig. 2. Classroom background sound levels are significantly affected by heating, ventilation and air conditioning systems.

Preparing for changing system requirements

Being involved early in the standards development process, such as seen in the classroom acoustics standard, helps everyone to be aware of what will be required. The standards often take multiple years to write, so being involved early provides time to adjust internal procedures about how to make measurements and calculations. The standards indicate what information to publish, so that system marketing materials can be organized and ready when the requirements take effect.

Knowing that a classroom will be required to meet a 35 decibel level allows us to guide customers on using our systems to meet the goal. It also gives a design goal for systems that will be located inside the classroom where there is little that can be done to control the noise impacting the occupants. By being involved, we are more likely to understand and meet our customer's needs.

Being active in standards work helps us to agree with our customers on what is the correct information to provide. Providing accurate, appropriate acoustical information for our solutions helps to make sure the system is applied correctly and increases the likelihood that customers will be satisfied with our systems. Being proactive instead of reactive makes it easier to plan expenses and be ready for change.

Taking part in the process helps to avoid conflicts, which helps to improve relations with our customers. Being aware of new or upcoming requirements helps to make sure our system designs will be accepted in the intended markets. Having agreed upon standards helps both our customers and us.**AT**

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1 P. Baade, *History of the Qualification Procedures of American National Standard S1.21-1972*, Noise Control Eng. J. **7** 48–51 (1976)

2 *ANSI/ASA S12.60-2002, American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools* (Acoustical Society of America, Melville, NY).

3 *ANSI/ASA S12.60-2010/Part 1, American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools* (Acoustical Society of America, Melville, NY).

Stephen J. Lind is an acoustics engineer in sound and vibration testing at Trane, a leading global supplier of indoor comfort systems and solutions and a brand of Ingersoll Rand. His work focuses primarily on measuring sound for Trane air conditioning systems. He is also active in the Air Conditioning Heating and Refrigeration Institute's Technical Committee on Sound and on the Acoustical Society of America Standards Committees S1 and S12. Lind received a Bachelor of Arts degree in physics from the University of Northern Iowa and a Master of Science in engineering degree in acoustics at the University of Texas at Austin under the supervision of Mark Hamilton and David Blackstock. Prior to joining Trane, Lind was an acoustical consultant in Los Angeles and Mississauga, Ontario. He currently resides in Onalaska, Wisconsin.

MODERN TOOLS FOR IMPROVING THE DEVELOPMENT OF ACOUSTICAL STANDARDS

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Introduction

In the past, the development of acoustical standards has followed largely on the trailing edge of technology. Given the progressively more rapid development of new technology, it is critical that new standards be developed when needed in the timeliest manner possible. Furthermore, participants in working groups are volunteers with limited time available for this important work. Budgetary constraints may also limit travel to in-person meetings for many persons otherwise interested in participating and whose practical experience is essential to the process. On-line meeting and collaboration tools enable shorter, more effective, and more frequent meetings to move draft standards more quickly to a ballot-ready document. Documents can be edited collaboratively in real time using standard mark-up tools for immediate feedback from participants. This also enables participation across time zones. The use of a password protected "cloud network" ftp site for working group documents (e.g., drafts, reference documents, meeting minutes, etc.) eliminates unnecessary e-mail traffic with large attachments and enables participants to access documents at any convenient time. A number of tools and practices can be leveraged to improve the contemporary standards development process. A case study shows how this has worked in practice.

"Working Group S3-37 was able to reduce the entire development time for a revision to just under 9 months in 2009."

Issues with the process

It is the job of the working group chair to engage the group members, coax time out of their already overloaded schedules, as well as to garner consensus on sometimes contentious issues. Standards work, by its very nature, is done by a "Volunteer Army." That is to say, it is no one's full time job. In the past, the logistics of standards work meant that a working group would typically meet face-to-face once or perhaps twice per year. In these economic times, even this may be prohibitive.

Practically, there are also issues with gathering information from the participants in an organized fashion, document review, sharing and version/change control, communications, and generally working in a collaborative fashion.

Figure 1 shows a diagram of a portion of the Acoustical Society of America (ASA) standards development process. From the perspective of a working group member (or chair), there are many decision points and actions outside the direct control of the working group. However, it can quickly be seen that the major development delay is with the working group itself. Not only is 3 years a long commitment from the working group members, but given the progressively more rapid development of new technologies, it is also critical that a new standard is issued in the timeliest manner possible. Rather than revolutionize the entire process, focus was on improvement of this part of the critical path.

A success story?

The annotation in the diagram indicates that Working Group S3-37 (which I chair) was able to reduce the entire development time for a revision of ANSI/ASA S3.25 to just under 9 months in 2009. Not surprisingly, there was no single "silver bullet" but instead a combination of efforts and established project management techniques newly brought to bear on the standards development process.

WG37 began with quick consensus on a draft document outlining the scope of the document revision, e.g., what was to be updated and what was not. This turned out to be essential to engage discussion, debate and eventual consensus. We then followed up with monthly on-line "Virtual Meetings" using WebEx and a conference call. We were aided by a resource provided by ASA, namely a password-protected web site for depositing documents, including drafts, contributions, meeting minutes, and reference materials. As Chair, I was responsible for maintaining this site and for timely posting of all documents. This eliminated spam emails with large attachments.

It was also advantageous that we stuck to a regular meeting schedule and protocol to keep everyone engaged. Another practice adopted by the working group was that at the end of each meeting, noted action items were assigned to individuals as "homework" due for the next meeting. Although somewhat new, this was surprisingly not the least bit controversial. Last but not least, lots and lots of *follow up*, ***follow up***, follow up by yours truly…

Progressive versions of the drafts also made intense use of the "mark-up" tools within MS Word to track changes. Version control also enabled us to show cleaned up versions of new drafts (with the previous meeting's changes accepted) but also to go back and undo if necessary. Another very effective tool was the use of balloon comments for posing questions to the group (e.g., "Should this clause be moved to an annex?"), responding to queries (e.g., "Why was this clause deleted?" "It wasn't. It was moved to Annex C."), and noting reminders to the group (e.g., "We need an updated reference for this…").

Conclusion

To be fair, most of these methods and processes were not innovative nor invented here, but rather best practices observed to be effective for similar projects and adopted or re-purposed for our own devices. Nonetheless, even the best tools will not by themselves ensure dramatic time savings nor smooth operation if they are not properly leveraged. It also greatly aids communication if these processes are transparent (as much as possible) to everyone involved. Needless to say, these same techniques are currently in use in S3WG67 (Manikins), the other working group that I chair.

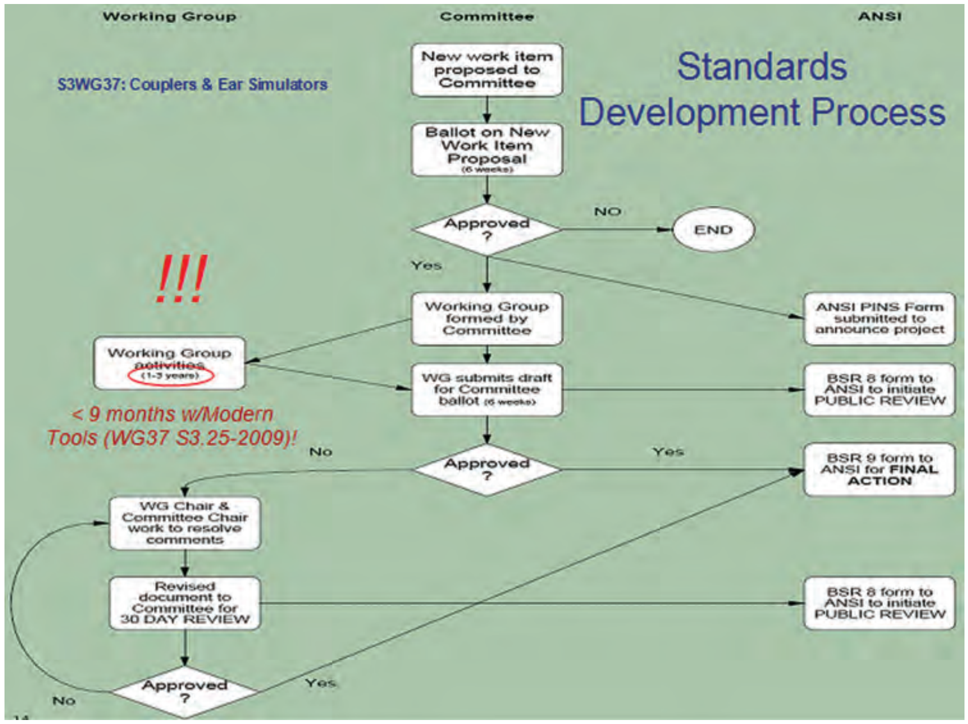

Fig. 1. Time for working group to come to closure.

In summary:

- Garner early consensus on the Revision Scope
- Engage the participants
- Have shorter (≤ 90 min), more frequent (monthly) on-line "Virtual Meetings"
- Use Tools within Word such as "track changes" and "comment" balloons to engage discussion
- Leverage the ASA's file transfer protocol (ftp) site for posting drafts, reference material, and meeting minutes
- Post all documents in a timely manner!
- Don't be afraid to assign homework
- Keep good records
- Keep WG processes transparent.**AT**

Christopher Struck is the CEO and Chief Scientist for CJS Labs, a consulting firm, in San Francisco. Mr. Struck was Electroacoustics Application Specialist at Brüel & Kjær—Denmark from 1986–1993. He was Principal Consultant for Charles M. Salter Associates from 1994–1995. From 1996–2001, he was Manager of Electroacoustics in the Research Group at GN ReSound. He was Director of Engineering at Dolby Laboratories from 2001–2005 and Vice President of Engineering for Tymphany Corporation in 2006. Mr. Struck holds a degree in Electrical Engineering from the University of Wisconsin—Madison, where his studies also included electronic music composition. Mr. Struck is the author of many technical papers, application notes and articles. During the course of his work, he has traveled extensively throughout the world, providing training and lecturing on the topics of acoustics, signal processing, and measurement techniques.

He is a Fellow and former Governor of the Audio Engineering Society (AES), a Member of the Acoustical Society of America (ASA), and a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). He is the Chair of the American National Standards Institute (ANSI) S3WG37 Working Group on Couplers and Ear Simulators and the Chair of the ANSI S3WG67 Working Group on Manikins. He is active on the AES SC-04-03 Working Group on Loudspeaker Modeling and Measurement, the AES SC-04-04 Working Group on Microphones, the ANSI S3WG48 Working Group on Hearing Aid Measurements, and the IEEE Subcommittee on Telephone Instrument Testing.

Acoustical News

Elaine Moran
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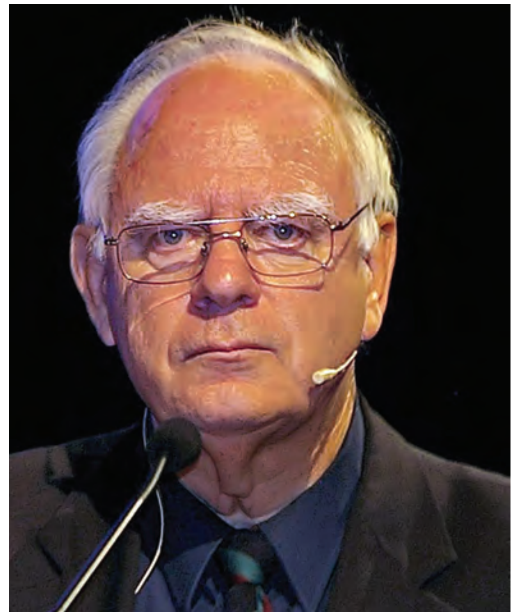
Photo Credit: University of Saskatchewan

Ilene Busch-Vishniac



Jens Blauert

Ilene Busch-Vishniac named next President of the University of Saskatchewan

Ilene Busch-Vishniac will take office as the ninth President of the University of Saskatchewan on 1 July 2012. She is currently provost and vice-president academic at McMaster University in Hamilton, Ontario.

Dr. Busch-Vishniac studied piano at the Eastman School of Music while taking classes at the University of Rochester but soon realized the performing arts were not for her. A freshman class called physics of music piqued her interest in acoustics so she switched to physics and mathematics for her undergraduate degrees.

She earned masters and doctoral degrees in mechanical engineering from the Massachusetts Institute of Technology before joining the Acoustics Research Department of Bell Laboratories. In 1981, Busch-Vishniac moved to the mechanical engineering faculty at the University of Texas. Then in 1998, she joined Johns Hopkins University as professor and dean until 2007 when she accepted the position at McMaster University.

Dr. Busch-Vishniac's research is focused on acoustics, particularly noise control and transduction. More recently, she turned her attention to characterizing and controlling noise in hospitals. Busch-Vishniac has published extensively and holds nine U.S. patents on electromechanical sensors. She has also done extensive research on how best to educate people in engineering. Her innovative work has earned her an impressive list of prestigious awards for both teaching and research including an NSF Presidential Young Investigator Award (1985), Curtis McGraw Research Award of the American Society for Engineering Education (1994), the Acoustical Society of America (ASA) R. Bruce Lindsay Award (1997), Achievement Award of the Society of Women Engineers, (1997), and the ASA Silver Medal in Engineering Acoustics (2001).

Ilene Busch-Vishniac is a Fellow of the Acoustical Society of America and has served in several leadership positions in ASA including Member of Executive Council (1988-91), Vice President (1996-97), and President (2003-04).

Prof. Jens Blauert Receives Lifetime Achievement Award From EAA

Prof. Jens Blauert, distinguished visiting Professor of the RPI Graduate Program in Architectural Acoustics, has been awarded Lifetime Achievement Award from the European Acoustics Association.

Professor Blauert studied communication engineering at the RWTH Aachen University, where he received a Doctor-of-Engineering degree in 1969. In 1973, he delivered an inaugural dissertation to the Technical University of Berlin (habilitation), and in 1994 he was awarded an honorary degree (Dr. Tech.) by the University of Aalborg, Denmark. In 1974 he became chair professor at the Ruhr-University of Bochum where he founded the Institute of Communication Acoustics (IKA) and headed it until 2003. Subsequently, he was assigned emeritus professor. He has been visiting professor in various countries worldwide.

He is the author/coauthor of more than 160 papers and monographs, supervisor of 52 successful PhD projects and has been awarded several patents. He has received several reputable scientific medals and awards. His major scientific fields of interest are spatial hearing, binaural technology, aural architecture, perceptual quality, speech technology, virtual environments, telepresence and quality of experience.

Professor Blauert has served as chairman of the board (and cofounder) of the European Acoustics Association (EAA) and president and vice president of the German Acoustical Society (DEGA). He is a fellow of the Acoustical Society of America, the Institute of Electrical and Electronic Engineering, the Institute of Acoustics, and the Audio Engineering Society. He is an honorary member of the German Audiological Society and the Polish Acoustical Society.

Calendar of Meetings and Congresses

Compiled by the Information Service of the International Commission for Acoustics

2012

25-30 Mar. Kyoto, Japan. IEEE International Conference on Acoustics, Speech, and Signal Processing. http://www.icassp2012.com

19-22 Mar. Darmstadt, Germany. 38th German Annual Conference on Acoustics (DAGA2012). http://daga2012.de/

18-20 April Senlis, France. International Conference on Fan Noise, Technology, and Numerical Methods (FAN2012). http://www.fan2012conference.org/

21-24 April Sorrento, Italy. Noise and Vibration: Emerging Methods (NOVEM2012). http://www.novem2012.unina.it

23-27 April Nantes, France. ACOUSTICS 2012-NANTES. http://www.acoustics2012-nantes.org/

13-18 May Hong Kong, China. Acoustics 2012 Hong Kong. Joint meeting of the 163rd meeting of the Acoustical Society of America, 8th meeting of the Acoustical Society of China, 11th meeting of Western Pacific Acoustical Conference and Hong Kong Institute of Acoustics. http://acoustics2012hk.org

21-24 May Tokyo, Japan. 19th International Symposium on Nonlinear Acoustics (ISNA2012). http://www.isna19.com/index

10-13 June Prague, Czech Republik. Euronoise 2012. http://www.euronoise2012.cz/

02-06 July Edinburgh, UK. 11th European Congress on Underwater Acoustics. http://www.acua2012.com

08-12 July Vilnius, Lithuania 18th International Congress on Sound and Vibration (ICSV19) http://www.icsv19.org

22-27 July Porto, Portugal Symposium on Vibration and Structural Acoustics measurement and analysis in conjunction with 15th International Conference on Experimental Mechanics (ICEM15) http://paginas.fe.up.pt/clme/icem15/

19-24 Aug. Beijing, China. 23rd International Congress of Theoretical and Applied Mechanics (ICTAM2012). http://www.ictam2012.org/

19-22 Aug. New York, NY, USA. Internoise 2012. http://www.internoise2012.com.

09-13 Sept. Portland, OR. USA. Interspeech 2012. http://interspeech2012.org

12-15 Sept. Granada, Spain. 30th European Conference on Acoustic Emission Testing (EWGAE) and 7th International Conference on Acoustic Emission (ICAE). http://2012.ewgae.eu/

12-15 Sept. Petrcane, Zadar, Croatia. 5th Congress of Alps-Adria Acoustics Association & 2nd Congress of Acoustical Society of Croatia (AAA2012). http://www.akustika.hr/had/kongrss

17-19 Sept. Leuven, Belgium. ISMA International Conference on Noise and Vibration Engineering (ISMA 2012). http://www.isma-isaac.be/conf/

21-23 Nov. Perth, Western Australia. 2012 Conference of the Australian Acoustical Society. http://www.acoustics.asn.au/joomla/acoustics-2012.html

2013

26-31 Mar. Vancouver, Canada. 2013 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP). http://www.icassp2013.com

02-07 June Montréal, Canada. 21st International Congress on Acoustics (ICA 2013) http://www.ica2013montreal.org

Books and Publications

Dick Stern
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Acoustics Today elcomes contributions for "Books and Publications." There is no charge for this service. Submissions of about 250 words that may be edited in MSWord or plain text files should be e-mailed to <acousticstoday@aip.org>. Cover graphics should accompany the text and must be at least 300 dpi. Please send the text and graphics in separate files.

Title: *Site and Sound—The Architecture and Acoustics of New Opera Houses and Concert Halls*
Author: Victoria Newhouse
Publisher: Monacelli Press
Binding: Hardcover
Pages: 272
Illustrations: 300
ISBN 978-1-58093-281-3
Publishing date: 10 April 2012

Site and Sound: The Architecture and Acoustics of New Opera Houses and Concert Halls begins with a historic overview to contextualize the iconic theater architecture of the latter twentieth century up to the dramatic new prospects now underway. Victoria Newhouse examines the inextricable link between acoustics and architecture through the ages. For each new theater she asks, "Does the music serve the space? Does the space serve the music?" Woven through Newhouse's multidimensional view of these grand spaces are the personal observations of a wide range of architects, acousticians, conductors, composers, and performers consulted in the innumerable theaters she visited. Stunning transformations, such as the most recent one of Lincoln Center for the Performing Arts, by Diller, Scofidio + Renfro, exemplify for Newhouse the shift in attitudes about the arts she finds in the United States towards urban placement and the needs of contemporary audiences and musicians. The in-depth treatment of fifteen new houses and concert halls in North America and Europe—from Snøhetta's hill-like Oslo Opera House to Zaha Hadid's small and temporary JS Bach Chamber Music Hall to Rem Koolhaas's Casa da Musica in Portugal—demonstrates current trends toward intimate and transparent interior spaces that fully integrate acoustics and toward a greater openness to the city. Newhouse devotes a separate chapter to the unprecedented proliferation of multi-hall Grand Theaters in the People's Republic of China. Along with the halls themselves, she critiques the cultural context and ideas behind these surprisingly idiosyncratic representatives of regional political power. The book concludes with a worldwide tour of the next generation of opera houses and concert halls including those just completed, currently under construction, planned, or merely hoped for. Evaluating her accumulated evidence and the variety opinions and studies about what lays in store for music and performance, Newhouse comes to surprising and optimistic projections of a vibrant future awaiting sites for sound.

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Instrumentation

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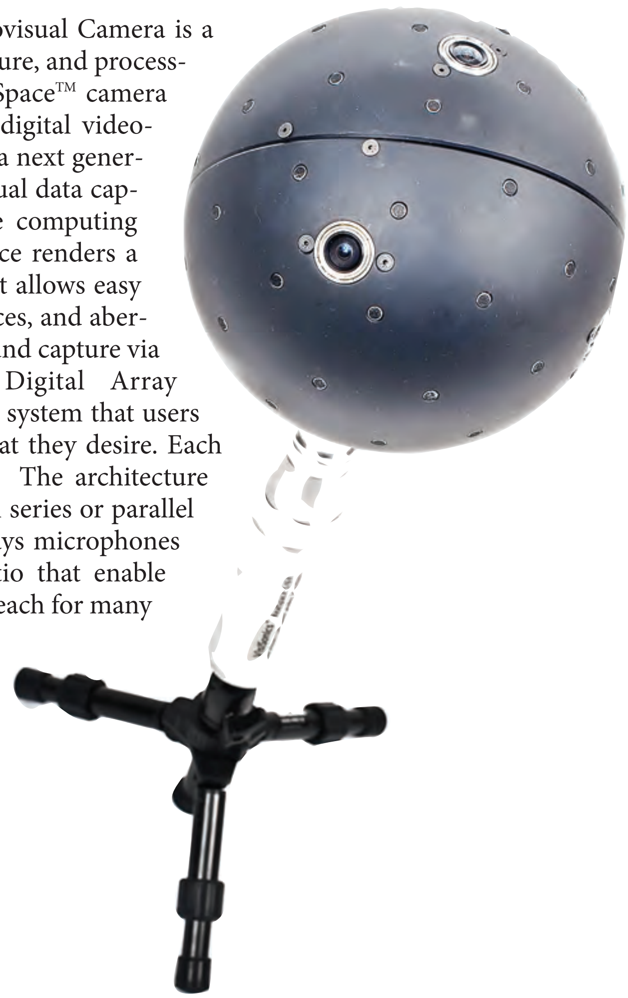

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