

REPORT OF ISO/TC 43, ACOUSTICS, AND ISO/TC 43/SC1, NOISE, STANDARDS MEETINGS IN FLORIANOPOLIS, BRAZIL, NOVEMBER 2012

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Background

The objective of the Acoustical Society of America's (ASA) Robert W. Young Travel Awards for Support of the Development of International Standards in Acoustics is to "provide limited financial support to assist individual experts to participate in the development of international standards prepared by Technical Committee 29, Electroacoustics, of the International Electrotechnical Commission (IEC/TC 29), as well as by International Standards Organization (ISO) Technical Committee 43, Acoustics (ISO/TC43), and ISO/ TC 43

"WG 45 had a lively discussion on possible effects from low frequency noise and infrasound from wind turbines."

Subcommittee 1, Noise (ISO/TC 43/SC 1), or their successor organizations."

Quantifications of ASA Robert W. Young Travel Award

"An applicant for a Travel Award shall be a citizen of, and reside in, the USA. An applicant shall be an expert in a technical field applicable to one or more Working Groups of IEC/TC 29 or ISO/TC 43 or TC 43/SC 1. Applicants shall indicate a continuing interest in the activities of a Working Group(s) and shall be willing to actively participate in meetings of the Working Group(s) and to contribute to the development of drafts of



Fig. 1 Meeting of ISO TC 43/SC 1 Working Group 28 in Florianopolis, Brazil, Tuesday, November 27, 2012. Left to right: Hideki Tachibana (Japan), Stephen Keith (Canada), Hans Kornprobst, WG Secretary (Germany), Jung Min-Kook (Korea), Brad Moulton (USA), Robert Hellweg, chair of meeting (USA), Jeff Schmitt (USA), Jean Jacques (France), Volker Wittstock (Germany), Hans Jonasson (Sweden), Leif Nielsen, Secretary of ISO TC 43/SC 1 (Denmark). (Photo credit: Lotte Sørensen, Denmark)

standards. An applicant for a Travel Award shall be self-employed, an employee of a small firm, semi-retired, or retired. Recipients of travel support awards shall be members of the Acoustical Society of America.”

2012 Award Recipients

The 2012 Robert W. Young Travel Award recipients were Robert Hellweg, Jeff Schmitt, and Laura Ann Wilber, who attended the ISO/TC43 and ISO/TC43/SC1 working group meetings held in Florianopolis, Brazil, November 26–30, 2012.

In addition to the three award recipients, the United States was represented by Paul Schomer (Head of the US delegation and ASA Standards Director), Elliott Berger (3M), Joseph Bocchiaro (InfoComm International), Douglas Moore (General Motors Company) and Brad Moulton (ExxonMobil).

- ISO TC 43 Working Groups that met in Florianopolis were:
 - WG 1 Threshold of hearing
 - WG 9 Method of calculating loudness level
- ISO TC 43/SC 1 Working Groups that met in Florianopolis were:
 - WG 17 Sound attenuation of hearing protectors
 - WG 28 Basic machinery noise emission standards
 - WG 42 Measurement of noise emission (external) from road vehicles (Joint TC 43/SC1/TC 22 working group)
 - WG 45 Description and measurement of environmental noise

The following are the reports of the three ASA Robert W. Young Award recipients on their activities—an overview from each followed by some of the meetings details.

Overview by Robert D. Hellweg, Jr.

Having received an ASA Robert W. Young Travel Award for the Development of International Standards, I was able to attend the ISO technical committee 43 (TC 43) (Acoustics) and the ISO/TC43 Subcommittee 1 (SC 1) (Noise) meetings in Florianopolis, Brazil. There were representatives from thirteen countries: Brazil, Canada, Denmark, France, Germany, Japan, Republic of Korea, Luxembourg, Norway, South Africa, Sweden, United Kingdom, and the United States of America. The previous ISO TC43 and TC43/SC1 meetings were held in London, England in April 2011.

I participated in two ISO/TC 43/SC 1 Working Group (WG) meetings: WG 28 “Basic machinery noise emission standards” and WG 45 “Description and measurement of environmental noise.” After the working group meetings, I attended the plenary meeting of SC 1 at which I reported the activities of WG 28 and the plenary meeting of TC 43.

It is important that the United States have effective representation at ISO working group meetings since, in practice, the responses to comments on draft standards are determined during those meetings. I believe overall the U.S. delegation was successful in accomplishing its goals, and where we were not successful we either understood

and accepted the reasons or knew what actions are needed for future success.

On a personal note, the organization of the meeting was well handled by Professor Samir Gerges and his aides, and the venue was exceptional—a hotel on a 3-mile beach perfect for running—with excellent food and wonderful weather. My detailed report follows after the other two reports.

Report by Jeff G. Schmitt

The ISO/TC 43/SC 1 Working Group 28 meeting on sound power level determination and sound pressure level measurement standards was held at the end of November 2012 in Florianopolis, Brazil. The meeting was well attended with representation from the US, Canada, Japan and several European countries contributing to the discussion.

Key standards under discussion were an upcoming revision to ISO 6926 on the calibration of reference sound sources. A significant number of technical comments had been received in response to circulation of the first Draft International Standard (DIS) version of the document and these were discussed at the meeting. Key areas of discussion involved issues related to measurement traceability and uncertainty, as well as clarifications and improvements to the general method requirements, which remain largely similar to the previous version of ISO 6926.

Also considered was a Committee Draft (CD) document on an amendment to ISO 3745 Acoustics— Determination of sound power levels of noise sources using sound pressure— Precision methods for anechoic rooms and hemi-anechoic rooms, Annex A, which would adopt the new ISO 26101 standard as the method for qualifying free field test environments for sound power level determination. A New Work Item Proposal and a first CD version of this amendment will be forthcoming in 2013.

A discussion of the recent revisions to the ISO 3740 series of sound power level determination standards, and in particular ISO 3744 (Engineering methods in an essentially free field over a reflecting plane), led to a general discussion on the overall complexity of the documents and difficulties that normal users have interpreting and implementing them. The Working Group agreed that in an attempt to have our standards address the more complex acoustic situations, we have made it difficult for most users to make the more typical measurements. As a result of these discussions, a task group was formed to develop some preliminary drafts of a simplified sound power standard, with ISO 3744 being the first work item for consideration. Additional actions are expected in this area during 2013.

Other agenda items included revisions to ISO 3740 and ISO 11200, both guidance documents for the overall series of sound power and sound pressure level standards and an upcoming ISO/DIS 9295 on high frequency sound power level determination. Other preliminary work items were also considered during the day and a half of meetings.

In addition to the WG 28 meeting, I also attended the WG 17 meeting on hearing protector testing. A CD version of an update to the ISO 4869 procedures for the measurement of hearing protector attenuation using the Real Ear

Attenuation at Threshold (REAT) method was discussed during that meeting. Several decisions were made in that working group meeting that might eventually lead to revisions to the ANSI/ASA S12.6 test method for REAT testing.

Florianópolis is a wonderful Brazilian city which provided a beautiful setting for the meeting.

Report by Laura Ann Wilber

ISO/TC 43 held its meeting in Florianópolis, Brazil from 26 to 30 November 2012. The first part of the week was devoted to working group meetings. I attended WG 1 “Threshold of Hearing” as a member of the working group, and WG 9 “Method for calculating loudness level” as the convenor of that working group. In addition I attended the plenary session on TC 43/SC 1 and the plenary session of TC 43, at which I presented a report on the actions of WG 9.

TC43/WG 1 Threshold of Hearing: I have been a member of TC 43/WG 1 since the late 1970’s. The Working Group is concerned with threshold measurements (e.g., Reference Equivalent Threshold Sound Pressure Levels (RETSPLs) for supra aural and circumaural earphones). At the ISO level there are currently standards for each type of transducer. In ANSI/ASA standards the tendency is to include all of these in one document (ANSI/ASA S3.6). Recently this working group was asked to take over the work on ISO 1999, Acoustics—“Determination of occupational noise exposure and estimation of noise-induced hearing impairment.” At the meeting in Florianópolis much of the time in the WG 1 meeting was spent going over suggested revisions to ISO/DIS 1999, most of which were editorial. ISO/DIS 1999 is being prepared for circulation as a Final Draft International Standard (FDIS). The group agreed on the changes which will be incorporated into the draft by the project leader, Stig Arlinger.

We also discussed recommended changes to ISO 389-3 Acoustics—“Reference zero for the calibration of audiometric equipment—Part 3: Reference equivalent threshold force levels for pure tones and bone vibrators.” Again, most of the comments were general or editorial, almost all were submitted by the U.S., and most were accepted.

There was some discussion of a proposed working draft of PWI 7029 Acoustics—“Statistical distribution of hearing thresholds as a function of age.” Considerable work in this area has been carried out in Japan and it is hoped that the final revision will extend the age range to 80 years. WG 1 has been involved with levels by age and sex for some years—and this data is incorporated in other standards it has promulgated.

There is a preliminary work item for revision of ISO 389-1 Acoustics—“Reference zero for the calibration of audiometric equipment—Part 1: Reference equivalent threshold sound pressure levels for pure tones for supra-aural earphones.” There continues to be concern, especially in Europe, that the TDH-39 earphone is not consistent from one earphone to another—and that there is an error at 6 kHz. This appears to go beyond the known concern of the changing grid cloths in this earphone. On several occasions it has been suggested that this earphone be deleted from the ISO stan-

dard, but since it is still widely used that has not yet been done. We will continue to be in contact with the manufacturer to determine whether this problem can be resolved.

There was further discussion of whether or not to revise ISO 389-7, -8, and -9. In the case of 389-8 which relates to circumaural earphones, there was concern as to whether the earphone referenced in the standard is still available.

Because of the limited time, it was agreed that the project leaders would circulate their documents for on-line review. There is no plan to meet again until the next plenary session of TC 43 in 2014.

TC43/ WG 9 (Loudness) has had somewhat of a contentious history because there are two different approaches for measuring stationary loudness—the revised Zwicker method (which is a DIN document) and the Cambridge method (Moore-Glasberg) which is essentially the same as the ANSI/ASA S3.4 standard on measuring loudness. We had been told that a standard could not contain two procedures which yielded different results. As a consequence the majority of members of WG 9 decided to support the Moore-Glasberg procedure. This position was initially supported by the member bodies, but at the last vote the document was rejected. Since the time limit for completion of the document had expired, it was not possible to continue revision. Thus this rejection ultimately led to the recommendation that two separate standards be created—one using the revised Zwicker method, and the other the Moore-Glasberg procedure. This suggestion was approved by the member bodies, and as a consequence two project leaders have been selected and preliminary work has begun on each document. These documents may also contain methods for measuring non-stationary (or fluctuating) noise. There was some discussion of each procedure and finally it was agreed that the project leaders would submit draft documents for review by the entire working group. In addition a preliminary date for a face-to-face meeting in Canada has been set to take place at the ICA/ASA/CAA meeting in Montreal in June 2013. Colin Novak, the project leader for the Moore-Glasberg document, will look into the feasibility of having this working group meeting in Montreal. In the meantime we will continue to exchange revision proposals will be exchanged via e-mail.

As the convenor of this working group, I also had to present a summary of our work at the plenary session. It should be noted that although TC 43 is the parent group (and the place that WG’s 1 and 9 reside), the majority of proposals in TC 43 come from the several working groups in TC 43/SC 1.

It should also be noted that the Brazilians were most accommodating to us at the meeting—the food was great, and some of our delegation revealed great dancing skills at the banquet.

Detailed report of committee activities by Robert Hellweg

I. ISO/TC 43/SC 1/WG 28 “Basic machinery noise emission standards”: William Lang has been convenor of WG 28 for many years, and I served as acting convenor of the meeting at his request. The United States had two other represen-

tatives at the WG 28 meeting (Jeff Schmitt and Brad Moulton), and other countries represented were: Canada, France, Germany, Japan, Republic of Korea, and Sweden. (see Fig. 1) The standards under discussion included:

- ISO 3744 Acoustics—Determination of sound power levels and sound energy levels of noise sources using sound pressure—Engineering methods in an essentially free field over a reflecting plane,
- ISO 3745 Acoustics—Determination of sound power levels of noise sources using sound pressure—Precision methods for anechoic rooms and hemi-anechoic rooms,
- ISO 6926 Acoustics—Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels,
- ISO 3740 Acoustics—Determination of sound power levels of noise sources—Guidelines for the use of basic standards,
- ISO 11200 Acoustics—Noise emitted by machinery and equipment – Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and at other specified positions,
- ISO 11201 Acoustics—Noise emitted by machinery and equipment—Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections, and
- ISO 11202 Acoustics—Noise emitted by machinery and equipment—Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections.

The ISO 3740 series of sound power standards and ISO 6926 are of particular importance to the ASA Accredited Standards Committee S12 (Noise) since the current versions have been nationally adopted as the ANSI/ASA S12.5x series and ANSI/ASA S12.5, respectively.

In addition the ISO/TC 43/SC 1 Secretariat asked WG 28 for a recommendation on the recent systematic review of several ISO Standards, for which the United States and two other countries had recommended revision:

- ISO 7574-1,-2,-3, and -4 (Statistical methods for determining and verifying stated noise emission values of machinery and equipment) and
- ISO 11689 (Procedure for the comparison of noise-emission data for machinery and equipment).

The ISO Central Secretariat requested that ISO/TC 43/SC 1 delete preliminary work items (PWI) in WG 28 which had not been active, and ISO/TC 43/SC 1 asked WG 28 for a recommendation on:

- PWI 4871 (Declaration and verification of noise emission values of machinery and equipment)
- PWIs 9614-1, -2, -3 (Determination of sound power levels of noise sources using sound intensity)

ISO 3744: Although not in attendance, WG 28 member Patrick Kurtz from Germany sent a letter to WG 28 urging

that the standard be simplified since it was unnecessarily complex for manufacturers to use and as a result manufacturers were using other less precise methods. Kurtz especially mentioned the uncertainty and background noise correction sections. All members agreed to the need for a simplified version, and WG 28 formed an ad hoc project team to start a revision immediately to simplify ISO 3744 – the project co-leaders will be Kurtz and Jean Jacques from France. Jeff Schmitt raised several issues with the current standard especially on the environmental correction K2, and it was clarified that it was intentional that there was no restriction on K2 in frequency bands but only on A-weighted K2.

Amendment to ISO 3745 Annex A on room qualifications. WG 28 resolved comments received from WG 28 members on the proposed amendment to Annex A, which will incorporate provisions in the newly adopted ISO 26101:2012 on anechoic room qualifications. At its meeting, ISO/TC 43/SC 1 approved a ballot for a new work item proposal for the proposed amendment. Jeff Schmitt suggested that it should be possible to use a draw away test to determine which portions of a room meet precision grade, engineering grade and then survey grade.

WG 28 recommended that TC 43 not disband WG 8 (Test methods for the qualification of free-field environments) as planned. WG 28 supported the proposal raised by

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several experts in WG 8 not to disband WG 8 to enable the continuation of their work on improvement of ISO 26101:2012.

ISO/CD 6926: Most of the US comments on the draft were either accepted or the rationale for accepting them adequately explained. The major exception was the rejection of the US comment to replace “calibration” with another term. The US comment was in response to the National Institute for Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) stating that it considers ISO 6926 to be a “calibration” standard (such as IEC standards for microphones and sound level meters) and not a measurement standard, and therefore, labs wishing accreditation must comply with ISO 17205 calibration laboratory requirements. It was agreed in WG 28, that the ISO 17205 requirements on calibration laboratories are not applicable to laboratories testing to ISO 6926, and WG 28 agreed to insert a paragraph or note stating this. (Apparently this problem is unique to the US and does not exist in other countries, especially in those countries where only one lab is accredited to test to ISO 6926 and it is also a “calibration” laboratory.)

ISO 3740: WG 28 comments on the first working group draft for the revision of ISO 3740 were briefly discussed in the absence of the project leader, Mr. Hubner from Germany. A detailed discussion will occur at the next meeting of WG 28 in spring 2013, when the project leader and other commenters will be present.

ISO/DIS 11200: ISO member body comments on the DIS ballot were considered and resolved. The project leader, Mr. Jacques, will prepare a draft Final Draft International Standard (FDIS) for WG 28 review and then submittal to the ISO Secretariat for ballot.

ISO 11201: Jeff Schmitt raised the issue that ISO 11201 permits precision-grade measurement but not an engineering-grade measurement of operator position emission sound pressure level when the major noise source is not line-of-sight to the microphone position. The concern by non-US members of WG 28 is that this could over estimate the emission sound pressure level during verification. The previous version of ISO 11201 permitted this type of measurement but did not allow environmental corrections. WG 28 agreed to consider an amendment with a note clarifying this and to permit such engineering grade measurements.

ISO 11202: Some inconsistencies in ISO 11202, raised by a previous Italian comment with respect to the determination of the local environmental correction K3 and the minimum 1-m distance, were discussed. These could lead to an underestimation of the emission sound pressure level for large machines or prevent the application of the standard for smaller sound sources. A proposal for an amendment specifying relevant requirements for small and large machines will be prepared by Messrs. Stephen Keith of Canada and Hans Jonasson of Sweden by January 31, 2013.

Systematic reviews of ISO 7574-1,-2,-3,-4 and ISO 11689: ISO/TC 43/SC 1 asked WG 28 for recommendation on the ballot for reconfirming these standards. The United States and two other countries voted that these standards should be revised instead of reconfirmed. However, WG 28

recommended reconfirmation since a project leader to revise the standards was not identified. Subsequently, ISO/TC 43/SC 1 agreed with the WG 28 recommendation after not finding a volunteer to be project leader from all members of SC1 who were present at the TC 43/SC 1 meeting. In my opinion the United States should not vote to revise an International Standard unless it also volunteers a project leader for that revision or supplies text suitable for the revision.

ISO 4871: WG 28 agreed to delete the preliminary work item (PWI) to revise ISO 4871 since no progress has been made. There is interest in the United States to revise this document; however, there is little interest elsewhere. As soon as a first working draft for revision of ISO 4871 is available a PWI will be reinstated.

ISO 9614-1, -2, and -3: WG 28 sent a questionnaire to its members to obtain information on the application of the sound intensity methods by industries and consultants. The reply date of this questionnaire is January 31, 2013. The deletion of these PWIs as requested by the International Organization for Standardization Central Secretariat (ISO/CS) was accepted by WG 28. As soon as a first working draft for revision of the ISO 9614 series is available a PWI will be reinstated.

ISO/TC 43/SC 1/WG 28 next meeting: The next meeting of ISO TC 43/SC 1/WG 28 will be in the second week of March or the second week of April 2013. Another WG 28 meeting will be held six months later in conjunction with INTER-NOISE 2013 in September 2013 in Innsbruck, Austria.

II. ISO TC 43/SC 1/WG 45: Environment Noise

Paul Schomer, who is the convenor of WG 45, Brad Moulton, and I were the United States’ representatives at the meeting. Other countries represented were: Canada, Denmark, France, Germany, Japan, Republic of Korea, Sweden, and the United Kingdom. The standards under discussion included:

- ISO/CD 1996-1 Acoustics—Description, measurement and assessment of environmental noise—Part 1: Basic quantities and assessment procedures
- ISO 1996-2 Acoustics—Description, measurement and assessment of environmental noise—Part 2: Determination of environmental noise levels

First ISO/CD 1996-1: WG 45 discussed and resolved comments received on national balloting of the first committee draft (CD1). Major changes include modifications and refinements to the noise exposure curves and adjustments for types of noise sources. Instead of preparing a DIS for ballot, WG 45 agreed to prepare a second CD which will be circulated for ballot in early 2013. This second CD will also include uncertainty on the percentage of highly annoyed as a function of sound level.

ISO 1996-2: WG 45 is preparing a revision of ISO 1996-2. A new work item will be presented to ISO TC 43/SC 1 and a draft is being prepared to accompany that ballot. The revision will include a new engineering grade prominent discrete tone procedure (details below).

Prominent discrete tone procedure: The existing engineering-grade fast Fourier transform (FFT) procedure in ISO 1996-2 will be replaced by a tone-to-noise ratio procedure based on DIN 45680. The new FFT procedure is similar to the tone-to-noise ratio procedures in ANSI/ASA S1.13 Annex A and ANSI/ASA S12.10 Part 1. The new tone method has procedures for handling tones in which the tone frequency changes, such as from wind turbines. The survey-grade one-third octave band method will not change, which is the same as that in ANSI/ASA S12.9 Part 3. Both WG 45 and ISO/TC 43/SC 1 are hopeful that the new tone procedure in ISO 1996-2 will be the basis for a stand-alone tone procedure, which would be referenced by both ISO 7779 (information technology equipment noise) and IEC 61400-11 (wind turbine noise).

Wind Turbine Noise: Paul Schomer stated that WG 45 is addressing two issues of wind turbine noise: 1) physical prediction of wind turbine noise in the environment and 2) human response. WG 45 agreed to publish a technical report initially instead of a standard.

WG 45 has not progressed much on the technical report; however, there was a lively discussion on possible effects from low frequency noise and infrasound from wind turbines. Paul Schomer opined that low frequency noise or infrasound from wind turbines could cause adverse health effects in some people who are prone to sea sickness; he estimated that this could affect only 0.1% to 1% of the exposed population. His assertion is based on both self-reported claims from some residents near wind turbines and results reported in journal articles concerning low frequency sound and infrasound from other sources. However, Hideki Tachibana from Japan presented recent research that he said demonstrates that low frequency noise and infrasound from wind turbines are not a problem (refer to his INTER-NOISE 2012 paper for preliminary information on his research.) This debate will continue as more research is conducted and published!

Impulse Noise: Doug Manville (Denmark) reported that the UK is considering revising BS 4142:1997 to include an objective method of identifying impulse corrections, and he will liaise with this development.

ISO/TC 43/SC 1/WG 45 next meeting: The next meeting will be sometime in 2013 – the date and place has not been set.

III. ISO/TC 43/SC 1 Plenary meeting:

Paul Schomer led the US delegation, and other US delegates were: Elliott Berger, Joseph Bocchiaro, Doug Moore, Laura Wilber and Robert Hellweg. SC 1 confirmed several standards and approved the circulation of numerous draft standards and several PWIs. Of particular note are the following:

During the SC 1 plenary meeting Joseph Bocchiaro of InfoComm International presented a US proposal for SC 1 to consider the international adoption of their American National Standard, ANSI/INFOCOMM 1M-2009, Audio Coverage Uniformity in Enclosed Spaces. Bocchiaro indicated that this would be the first of several standards. There was agreement that this was needed, but there was much discussion on whether the standards should be Audio Engineering Society (AES) or ISO standards. Schomer and Bocchiaro explained that they considered AES, but decided that the work was better suited in ISO/TC 43. There was more discussion on whether it should be in ISO TC 43/SC 1 or ISO/TC 43/SC 2 (Building Acoustics). It was agreed that the US would submit a revised new work item proposal to SC 1 with the existing ANSI/INFOCOMM standard as Part 1. Bocchiaro will prepare this proposal for SC 1 ballot.

With the resignation of William Lang as convener of WG 28, SC 1 appointed Robert Hellweg as convener of WG 28. There were numerous expressions of gratitude and appreciation to Bill Lang for providing leadership and years of service as convener of WG 28.

ISO TC43/SC1 next meeting: The next meeting of ISO/TC 43/SC 1 will be in Berlin at the Deutsches Institut für Normung (DIN) offices during the week of May 19 – 23, 2014.

IV. ISO/TC 43 Plenary meeting

Paul Schomer led the US delegation, and other US delegates were: Elliott Berger, Doug Moore, Laura Wilber and Hellweg. Of particular note is the following:

TC 43 agreed to continue WG 8 and will accept a PWI entitled “Test methods for qualification of free-field environment.” Jeff Schmitt was appointed as convener of WG 8.

ISO/TC 43 next meeting: The next meeting of ISO/TC 43 will be in Berlin at the DIN offices during the week of May 19–23, 2014. [AT](#)



Robert Hellweg holds BS and MS degrees in aeronautical and astronautical engineering from the University of Illinois. While in graduate school, he worked one summer as an intern at the National Aeronautics and Space Administration (NASA) Manned Spacecraft Center acoustic lab in Houston, Texas, and realized then that he wanted to work in Acoustics Engineering. Bob is a Fellow of the Acoustical Society of America (ASA), a Fellow of the Institute of Noise Control Engineering/USA (INCE/USA), a registered Professional Engineer in Illinois, and a Board Certified member of INCE/USA. Bob is a past president of INCE/USA and is currently Treasurer of the INCE Foundation. He is the Vice-Chair of the ASA Committee on Standards (ASACOS) and is past chair and vice-chair of ASA Standards Committee S12 Noise. He is a member of several ASA standards working groups and of several ISO working groups. He is a member of ASA Technical Committees on Noise and Architectural Acoustics. Bob has over 45 years experience in acoustics and noise control engineering. He is sole proprietor of Hellweg Acoustics and a senior consultant at Epsilon Associates. Previously, he worked at Hewlett-Packard (HP) (via the mergers with Compaq and Digital Equipment Corp) in quieting and testing Information Technology products, at the Illinois Environmental Protection Agency in the Noise Pollution Division, at Martin Marietta, and at McDonnell Douglas. In his spare time, he enjoys jogging (having completed 15 marathons including 6 Boston marathons), traveling and hiking with his wife, reading books, and spending time with his children and grandson.



Jeff G. Schmitt, P.E. has been practicing in the area of acoustics for over 30 years, specializing in laboratory design, acoustic measurements and ISO 17025 quality systems. Mr. Schmitt currently serves as an acoustics laboratory assessor for the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program and Co-Chairs S12/WG 23 on Sound Power and Sound Pressure standards. In addition to his work in sound emissions of products and equipment, Mr. Schmitt is also active in the areas of testing of building acoustics measurements and hearing protector attenuation. Mr. Schmitt's company, ViAcoustics, is based in Austin, Texas.



Laura Ann Wilber received her Bachelor's degree from the University of Southern Mississippi in Speech Correction, her Master's from Gallaudet in Deaf Education; and her doctorate in Audiology under Raymond Carhart from Northwestern University. After completing her doctorate she moved to UCLA to do research with Victor Goodhill. Later she moved to New York to serve as the Speech and Hearing Clinic Director at Albert Einstein College of Medicine. Dr. Wilber was a professor of Audiology at Northwestern University from 1978 until she retired at the end of 2002. She was on the environmental control board in New York City as the "Noise Expert," and has represented the United States since 1977 on various International Organization for Standardization (ISO) working groups related to bioacoustics. She has been a member of several American National Standards Institute (ANSI) working groups and served as chair of Standards Committee S-3. She also served as president of the American Speech-Language-Hearing Association (ASHA). She is currently professor emerita at Northwestern University.