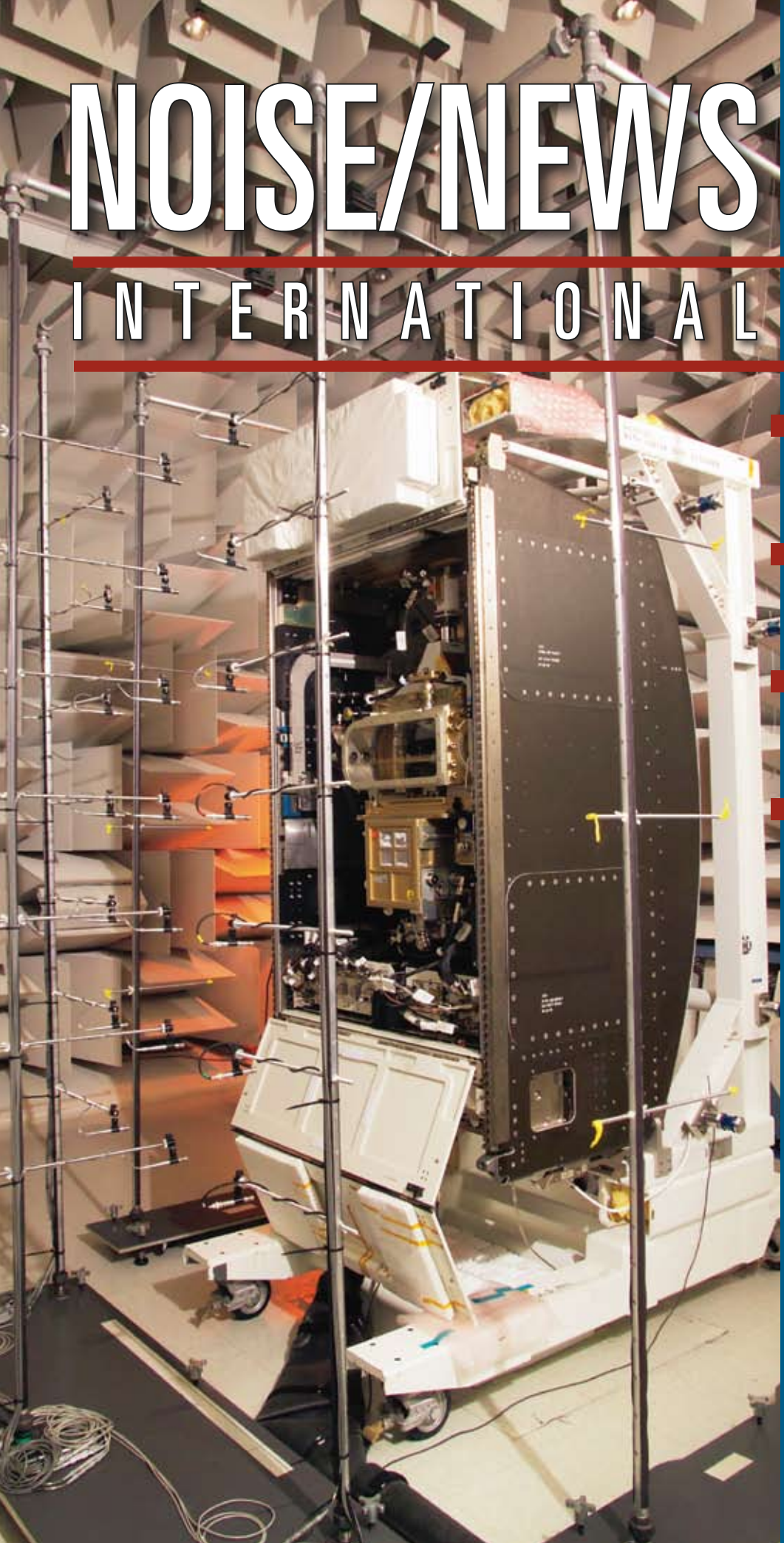
# NOISE/NEWS INTERNATIONAL

Volume 13, Number 3
2005 September

*A quarterly news magazine with an Internet supplement published by I-INCE and INCE/USA*



**FEATURE:**
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**ACTIVE 2006**
Announcement and Call for Papers

**MEMBER SOCIETY PROFILE**
German Acoustical Society

**NASA ACOUSTICAL TESTING LABORATORY**
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# NOISE/NEWS INTERNATIONAL

A quarterly news magazine with an Internet supplement published by I-INCE and INCE/USA

**Volume 13, Number 3** **2005 September**

## Features



## Departments



**Cover Photo:**
*NASA Acoustical Testing Laboratory*
*Courtesy of the NASA Glenn Research Center*





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**Printed in the United States of America**

# NOISE/NEWS INTERNATIONAL

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## I-INCE

The International Institute of Noise Control Engineering (I-INCE) is a worldwide consortium of societies concerned with noise control and acoustics. I-INCE, chartered in Zürich, Switzerland, is the sponsor of the INTER-NOISE Series of International Congresses on Noise Control Engineering, and, with the Institute of Noise Control Engineering of the USA, publishes this quarterly magazine and its Internet supplement. I-INCE has an active program of technical initiatives, which are described in the Internet supplement to NNI. I-INCE currently has 46 Member Societies in 39 countries.

## INCE/USA

The Institute of Noise Control Engineering of the USA (INCE/USA) is a non-profit professional organization incorporated in Washington, D.C., USA. The primary purpose of the Institute is to promote engineering solutions to environmental noise problems. INCE/USA publishes the technical journal, *Noise Control Engineering Journal*, and, with I-INCE publishes this quarterly magazine and its Internet supplement. INCE/USA sponsors the NOISE-CON series of national conferences on noise control engineering and the INTER-NOISE Congress when it is held in North America. INCE/USA Members are professionals in the field of noise control engineering, and many offer consulting services in noise control. Any persons interested in noise control may become an Associate of INCE/USA and receive both this magazine and *Noise Control Engineering Journal.*

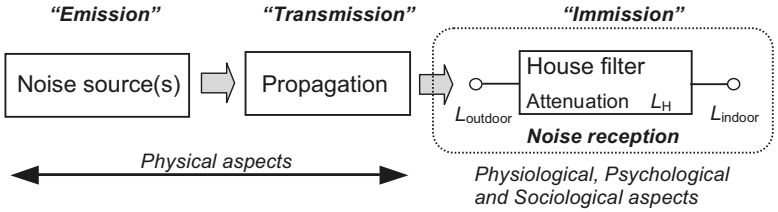
## NNI Internet Supplement

**www.noisenewsinternational.net**

- Links to the home pages of I-INCE and INCE/USA
- Abstracts of feature articles in the printed version
- Directory of the Member Societies of I-INCE with links, where available, to the Member Society Profiles and home pages
- Links to I-INCE Technical Initiatives
- Calendar of meetings related to noise—worldwide
- Links, where available, to NNI advertisers
- Links to news related to the development of standards
- Link to an article "Surf the 'Net for News on Noise," which contains links to noise-related sites—worldwide

# Noise Emission and Immission

In recent INTER-NOISE Congresses, the terms "emission" and "immission" are often discussed in the sessions regarding environmental (community) noise, though these terms are not always clearly defined. Noise "emission" is a concept regarding noise radiation from noise sources and its magnitude is generally expressed by sound power (or sound energy for transient noise sources), or sound pressure at a specified position near the source. On the other hand, noise "immission" is a concept regarding the acoustical situation at a certain position exposed to any noise source(s) and the extent of exposure is generally measured by sound pressure.




- Sound power level
- Sound energy level
- Temporal characteristics
- Spatial characteristics
- Spectrum characteristics
- Attenuation at source

- Distance attenuation
- Noise barriers
- Ground effect
- Meteorological effect

- Annoyance (disturbance)
- Sleep disturbance
- Dose-response relationship
- Social factors
- Noise indicators

Environmental noise problems can be divided into three steps: noise source(s), propagation, and reception; in other words, "emission," "transmission," and "immission." For noise source(s) and noise propagation, a physical approach is essential and important, whereas for noise reception, not only a physical approach but also physiological, psychological and sometimes sociological approaches are necessary. That is, how to assess the influence of environmental noise on human beings is the essential problem. It includes the problems of noise metrics, noise measurement (monitoring), and dose-response relationship. Based on these, noise exposure limits (criteria), guidelines, requirements, regulations, standards, etc. can be legislated. (Here, these legislative terms should be defined and clearly distinguished in this kind of discussion.)

The first and the most important action to mitigate community noise is to reduce the magnitude of the noise source, and "emission regulation" is necessary as a legislative (political) measure. For this goal, it is necessary to standardize internationally the acoustic quantities expressing the noise emission and their measurement methods. In this respect, the role of the International Organization for Standardization (ISO) is very important. The level of emission regulation should be determined by each country for each noise source. But this kind of regulation for industrial products has to be carefully considered because it can cause international trade friction. Regarding the methods of measuring and expressing the noise emission by noise sources, there remain many technical problems to be discussed and standardized. For example, machines used for construction works have a variety of temporal characteristics; not only steady but also fluctuating, impulsive and intermittent noise sources are included.

As mentioned above, "noise immission" is an acoustical condition at some position remote from the noise source(s), and therefore it seems not suitable for "regulation" in the case of the living environment. It should be specified as a "guideline" or similar name as a target (criteria) for keeping the living environment in good acoustical condition. From the viewpoint of "global noise policy," it is desirable to set certain criteria internationally, but it should be noted that each country has its own historical process, cultural background, industrial development process, transportation system, and environmental awareness. Nevertheless, we have to discuss the possibility to find any basic common methodology for the assessment of "noise immission." It may also be effective to discuss this problem from a viewpoint of a "soundscape." For the assessment of noise immission, $L_{Aeq}$ is generally being used in almost all countries. This type of noise metric—based on energy—is proper not only for noise monitoring but also noise impact assessment. However, it should be further considered if $L_{Aeq}$ is sufficient for the assessment of noise immission from physiological and psychological viewpoints. In addition, the assessment method of $L_{Aeq}$ (time interval, assessment position and condition) needs to be further discussed.

**Hideki Tachibana**
*2005 I-INCE President*

# Keeping up Standards

**Bernard Berry**

*European Editor*
*I-INCE VP for Europe and Africa*

This *Editor's View* is written to raise awareness of a general "malaise" in the vital process of standardization. It uses illustrations from my personal experience of work as Chairman of a Committee of the British Standards Institution [BSI] in the UK, but it may be that readers can identify similar issues in their own countries.

In 2004, BSI initiated a process of "Resource Re-allocation,"one of those modern business euphemisms for "cost-cutting," which we have all come across. The current work programs of over 1000 committees and subcommittees were reviewed in a very superficial and error-ridden way.

The outcome was, in effect, a significant reduction in Secretariat support to many committees, including all 5 subcommittees under the "umbrella" of the main BSI Committee on Acoustics. These subcommittees deal with key topics of: Transport Noise, Machinery Noise, Industrial and Residential Noise, Building Acoustics, and Hearing.

Essentially, individual Committee members, who had been voluntarily assisting BSI to develop high quality British Standards—providing their independent technical expertise to the committees at considerable costs to themselves—were now also being asked to provide their own Secretariat services, taking minutes etc, and keeping an "official" record of key decisions. Many of these decisions could have significant legal and financial implications, in view of the ultimate application of the kind of standards being developed. At one time, even the normally expected free provision of meeting rooms and associated facilities was under question.

This removal of secretariat services, which some might see as a minor irritation, has demoralised many stalwarts of the standardization process. This surely cannot bode well for sustaining their support. And it comes at a time when it is clear that the general level of support for standardization activities, from many organizations which have traditionally provided the membership of key committees, is in rapid decline. It is generally the case that only where an issue is of crucial economic importance to a specific organization, will a committee member's time and expenses be fully funded.

During recent months, this has also had a significant negative impact on the level of involvement of UK experts in the international scene, e.g., in ISO Committees. There are indications that other countries that have traditionally provided experts to such Committees are experiencing similar problems. Politicians certainly want to make use of standards and refer to them in legislation, particularly in what we might call "green" and social and environmental areas. But they do not allocate money to their Ministries and Agencies enabling their experts to participate and to support the standards work. Somehow it is assumed that vital standards will continue to be revised and developed. Even industry in the acoustics area does not see an immediate economic outcome of participation, and believes that there is always someone else who should pay.

Recently this problem has been evident closer to the "center" of the international standardization process, with threats arising even to the long-established support, which many of us have assumed would "always be there," necessary to maintain the Secretariat of ISO Technical Committee 43 "Acoustics," and its subcommittees.

I raise these issues to stimulate debate but, more crucially, as a plea for ideas for action on a major problem. In the UK, the Institute of Acoustics is actively working on steps it might take to help in stimulating and supporting greater participation of its members in national and international committee work, and so act to reverse the decline noted above. It is also considering more radical steps it might take to become more closely involved in the process of standards development.

As ever, the views of representatives of other I-INCE Member Societies are welcome.


**2006 International Symposium on Active Control of Sound and Vibration**

**Adelaide, Australia**

**18-20 September 2006**

# Announcement and Call For Papers

The 2006 International Symposium on Active Control of Sound and Vibration, ACTIVE 2006, is the sixth in the series of the ACTIVE conferences that provides an exciting opportunity for researchers and engineers in active control to discuss on-going research and new directions. The ACTIVE conferences typically attract over one hundred papers and authors from a multitude of countries.

The Sixth Symposium on Active Control, ACTIVE 2006, will be held at the University of Adelaide, South Australia, Australia from the 18th to 20th of September, 2006. ACTIVE 2006 is being organized by The South Australian Division of the Australian Acoustical Society, and is sponsored by the Institute of Noise Control Engineering of the USA in cooperation with the International Institute of Noise Control Engineering.

## Keynote Speakers

- Scott Sommerfeldt, *Bringham Young University, USA*
- Paolo Gardonio, *University of Southampton, UK*
- Marty Johnson, *Virginia Tech, USA*
- Jie Pan, *University of Western Australia, Australia*

*Photo courtesy of Marketing & Strategic Communications Office, The University of Adelaide*

*Photo courtesy of Andrew Riha*

## Scientific Committee

The scientific committee comprises many distinguished international members including:

Alain Berry, Canada
Damien Leclercq, Australia
Michael Brennan, UK
Xinye Li, China
Ben Caolato, Australia
Xiaodong Li, China
Rob Clark, USA
Brian Mace, UK
Stephen Elliott, UK
Kam Ng, USA
Francesco Franco, Italy
Jie Pan, Australia
Christopher Fuller, USA
Christopher Park, USA
Paolo Gardonio, UK
Xiaojun Qiu, China
Gary Gibbs, USA
Boaz Rafaely, Israel
Colin Hansen, Australia
Alain Roure, France
Carl Howard, Australia
Richard Silcox, USA
Marty Johnson, USA
Nobuo Tanaka, Japan
Nicole Kessissoglou, Australia
Jing Tian, China
Mike Kidner, Australia
Anthony Zander, Australia

## Local Organizing Committee

Mike Kidner, *Co-Chair*
Carl Howard, *Co-Chair*
Anthony Zander, *Scientific Committee Chair*
Colin Hansen
Ben Caolato
Laura Brooks
Byron Martin
Guillaume Barrault
Jason Turner
Peter Maddern
Luke Zoontjens
Peter Teague
Tom Bammann
Will Robertson

## Topics to be Covered

The Organizing committee welcomes submissions of abstracts for papers on the following topics:

- Active sound control
- Active control of outdoor sound
- Active control in ducts
- Active control of sound in vehicles
- Active control of sound transmission
- Active control of interior noise
- Active control of aeroelastic systems
- Active jet noise control
- Hardware for active control
- Active structural acoustic control
- Smart materials and structures
- Feedforward control
- Feedback control
- Non-linear control
- Signal processing and algorithms
- Active vibration control
- Active vibration isolation
- Semi-active (adaptive) control
- Active position control
- Transducers for active control
- Audio applications
- Virtual reality in acoustics
- Underwater applications
- Underwater communications
- Array processing and imaging
- New directions in active control

## Abstract Submission

To submit your abstract, first visit the ACTIVE 2006 website at http://www.active2006.com and click on the 'Submit Abstract' link. Here you will be asked to enter the details for each author and an abstract of approximately 150 words. Papers submitted to ACTIVE 2006 will be peer reviewed and considered for submission to a special issue of INCE Noise Control Engineering Journal.

ACTIVE 2006

# ACTIVE 2006

## Contact Us

The following email addresses should be used to contact the organizing committee:

***Conference Chair***
chair@active2006.com

***Technical Committee Chair***
technicalchair@active2006.com

***Web Site***
webmaster@active2006.com

***Proceedings Editor***
proceedings@active2006.com

***Registration***
registration@active2006.com

***Exhibition***
exhibition@active2006.com

***Telephone***
+61 8 8303 5460

***Facsimile***
+61 8 8303 4367

***Postal Address***
ACTIVE 2006 Conference
School of Mechanical Engineering
The University of Adelaide
SA 5005 AUSTRALIA
www.active2006.com

*Photos courtesy of Andrew Riha*

## Key Dates

31 January 2006.....Abstract submission deadline
1 February 2006.....Open Paper submission
31 March 2006.....Close paper submission
1 April 2006.....Commence review process
16 May 2006.....End of review process
23 June 2006.....Final paper submission

## Exposition

If you are interested in having an exhibition stand at the conference, please write to exhibition@active2006.com.

## Registration Fees

| | Before 23 June | After 23 June 2006 |
|---|---|---|
| Registration Fee | 600 AUD | 700 AUD |
| Student | 300 AUD | 350 AUD |
| Accompanying Persons | 150 AUD | 150 AUD |

All prices are in Australian dollars (AUD) and include G.S.T. where applicable.

## Social Program

***Sunday, 17 September***
Evening Reception at State Art Gallery, Adelaide with live entertainment

***Monday Evening, 18 September***
Banquet at The Stamford Grand, Glenelg Beach by heritage tram

***Tuesday Evening, 19 September***
Dinner at the Adelaide Zoo, Adelaide

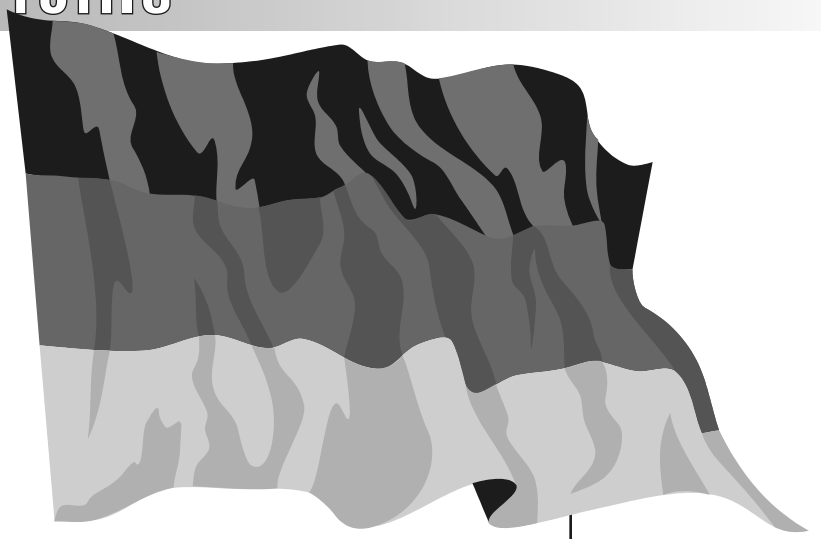
***Wednesday Afternoon, 20 September***
Close of conference. Drinks and barbeque at the conference venue

## About Adelaide

In Adelaide's compact city centre, all facilities, from the convention centre and hotels to cafés and nightclubs, are conveniently clustered within walking distance of each other. With its pivotal location on the continent, and an international airport only 10 minutes from the CBD, Adelaide makes an ideal launchpad for flights north, south, east and west, to any other Australian city, or to regional South Australia.

Another great advantage is the city's proximity to a host of special tour destinations - from the Barossa Valley, Adelaide Hills and Fleurieu Peninsula to Kangaroo Island. The region around Adelaide provides plenty of opportunity for sightseeing, from the local vineyards to the rugged coastline of Victor Harbor and Kangaroo Island.


# German Acoustical Society



In less than 20 years, the German Acoustical Society (Deutsche Gesellschaft für Akustik or DEGA) has grown into a robust professional organization serving over 1,100 regular members and 44 sustaining members. The group was founded in 1989 for German-speaking acousticians working in both the theoretical and applied subdisciplines of acoustics. Prior to its formation, aspects of the field were covered by various German societies devoted to physics and the classical engineering disciplines.

The main goal of DEGA is to support science and research in the field of acoustics. The group is the main organizer of the annual German conference on acoustics. Known as Germany's premier acoustics event, DAGA regularly draws 900 delegates, 30 exhibitors, and 400 contributions. DEGA also provides scientific and financial support for other acoustical congresses, such as the Ultrasonic World Congress held in 1995 in Berlin and two international joint DEGA conferences, one in 1999 with ASA and Forum Acusticum and the other in 2004 with the French Acoustical Society.

DEGA members offer a guide of university lectures for students and training courses for engineers on topics like room acoustics and psychometrics. They participate actively in International Noise Awareness Day, which is next scheduled for 25 April 2006. Members also support 10 working groups focused on the following topics:

- acoustics of speech
- auditory acoustics
- building and room acoustics
- education in acoustics
- electro-acoustics
- musical acoustics
- noise (effects and protection)
- physical acoustics
- ultrasound
- vehicle acoustics

Membership in DEGA is open to anyone with an interest in acoustics. Students pay a reduced membership fee—the society currently has 82 student members—and industry is welcome to join as sustaining members. Membership benefits include a free subscription to the European archival journal Acustica/Acta Acustica and reduced registration fees for the annual congress. A special congress registration fee is offered to non-members: For a small additional charge, non-members who attend the congress receive full membership benefits for one year. Most choose to stay with DEGA after the initial year.

DEGA's governing body consists of its president, vice president, treasurer, and three additional board members. There is also an advisory board comprised of the chairmen of the working groups and many representatives elected by the assembly of members.

DEGA uses the Society News section of Acustica/Acta Acustica to keep its members informed of society activities. A newsletter titled Sprachrohr and published three per year supplements this effort. DEGA also maintains a Web site (www.dega-akustik.de) for sharing news and information about the group.

DEGA's current president is Prof. Dr.-Ing Hugo Fastl, the vice president is Dr.-Ing Jens Baluert, and the group's treasurer is Dr.-Ing. Joachim Scheuren. The primary contact is Dr.-Ing. Martin Klemenz. Contact information is given below:

Name.....Deutsche Gesellschaft für Akustik e.V.
Address ..... Voltastrasse 5, Building 10-6, D-13355 Berlin, Germany
Phone ..... +49-30-46 06 94 63
Fax ..... +49-30-46 06 94 70
E-mail .....dega@dega-akustik.de

*This is the 51st in a series of articles on the Member Societies of International INCE.*

# Second Annual Workshop on Global Noise Policy

**William W. Lang and Tjeert ten Wolde, Workshop Co-Chairs**

## Introduction

The Second Annual Workshop on Global Noise Policy was held on 2005 August 03—during INTER-NOISE 05—at the Hotel Copacabana Praia in Rio de Janeiro, Brazil. The first workshop was held in conjunction with INTER-NOISE 04 in Prague, Czech Republic in 2004 August *(See the report in the 2004 December issue of NNI.—Ed.)*

The 2005 Workshop was divided into three sections, as shown in the program below.

### Session 1

**10:00 Chair's Opening:**
*"The Challenge of a Global Noise Policy"*

**10:15 Dieter Schwela:** Stockholm Environment Institute, UK
*"Noise of consumer products: Consequences in environmental health"*

**10:30 Bernard Berry:** Berry Environmental Ltd., UK
*"Noise labeling and noise policy"*

**10:45 Jean Tourret:** Consultant, France
*"Need for noise policies for developing countries"*

**11:00 Discussion**

### Session 2

**14:00 Lex Brown:** Griffith University, Australia
*"Community Noise: How do we get some political traction?"*

**14:15 Alain Depitre:** Aviation-Civile, France
*"Aircraft noise certification and airport noise local rules"*

**14:30 Volker Irmer:** Umweltbundesamt, Germany
*"European legislation on outdoor equipment noise"*

**14:45 Carlos Grandi:** Embraer, Brazil
*"Requirements for aircraft interior noise control"*

**15:00 Discussion**

### Session 3

**16:15 Elliott Berger:** E-A-R Aearo, USA
*"Hearing-protection related issues, product labeling, and current OSHA activities"*

**16:30 Wolfgang Probst:** ACCON GmbH, Germany
*"Noise prediction and noise mapping for improved planning"*

**16:45 Stephen Keith:** Health Canada, Canada
*"Health Canada's approach to occupational and community noise"*

**17:00 Discussion**

### Session 1

William Lang welcomed attendees to Session 1 of the workshop, introduced his co-convener, Tjeert ten Wolde, and opened the workshop with a few words about the challenge of a global noise policy. He quoted a summary of the challenge by Dr. John H. Sununu, a well-known American engineer:

> *"It is clear to engineers and scientists . . . that science and technology—engineering—not only continue to play a role in improving quality of life . . . but also are critical to developing and implementing policy at the national and international level . . .*
>
> *"I stress this point because I am concerned that engineers in general have been negligent in their direct participation in the process of shaping and implementing public policy."*

He said that Dr. Sununu summarized succinctly what we are doing today—emphasizing the engineering and technology aspects of public policy. The challenge of a global noise policy is to focus on the engineering viewpoint as it relates to this important issue.

The first presentation was prepared by Dr. Schwela on "Noise of consumer products: Consequences in environmental health" This was given by Dr. ten Wolde in Dr. Schwela's absence. He pointed out that there is a wide variety of products included in the definition of consumer products:

- Recreational vehicles
- Workshop equipment and products used in connection with hobbies
- All kinds of household appliances
- Information technology equipment such as computers
- Toys
- Devices for listening to music

*"... science and technology ... are critical to developing and implementing policy at the national and international level."*

He pointed out that the report of Technical Study Group 5 (TSG 5) does not include the last item.

In the World Health Organization guidelines, there is little difference, he said, between environmental noise and consumer product noise because the latter is actually treated as part of environmental noise. There are, he said, many countries that have information on community noise, but little information on consumer product noise. In any case, he said, there is not much knowledge of the effects of consumer product noise, except within the European Union where attention is being paid to:

- Outdoor equipment noise,
- noise from household appliances,
- noise from toys, and
- general considerations for product safety (2001/95/EC).

The outdoor equipment, he said, is professional equipment, and the guidelines on household appliances are not mandatory.

Market mechanisms, he said, may be effective for control of consumer product noise provided that:

- Individuals understand what is noise and what is not, and
- the effects of all sound are understood by the general public.

Risk perception, he said, is a very important element in making progress in the control of consumer product noise.

Bernard Berry then gave his presentation on "Noise labeling and noise policy." Work on noise labeling is in progress through the work of I-INCE Technical Study Group 2, and he said that the goals of that Group are to:
Have low noise emissions recognized as a competitive factor, label products in such a way as to increase peoples awareness of excessive noise, and reduce noise immission levels to preserve health and provide an acceptable environment.

He said that twelve countries are represented on TSG 2, and that the scope of the Group covers:

> A survey of current labeling methods, methods of measurement used by testing authorities, assessment of the effectiveness of different labeling methodologies, and providing advice on how noise labeling should be implemented.

He reviewed the progress that TSG 2 has made since approval for its formation was given by the I-INCE General Assembly in 1999. This includes a questionnaire on noise labeling sent to many countries by the Group.

He gave examples of different labels being used—including both labels with numerical information and environmental labels such as the Blue Angel label developed in Germany (and now used in China). One numerical example he gave was noise emission information on an IBM Enterprise Server posted on the Internet. The page included numerical levels, information on relative noise emission levels, and information on the radiation of discrete frequency tones and impulsive noise.

He concluded with a list of recommendations from TSG 5:

- Market forces are effective but should be improved by international harmonization.
- Standardized declarations of product noise levels should be published, primarily in electronic form on company websites, but also in hard-copy technical documentation and product information brochures, where appropriate.
- Toys: globally-harmonized upper limits on noise-emission levels should be prepared and published, similar to the noise level limits adopted in the European Union.
- International support should be developed to improve International Standards related to consumer product noise
- Manufacturers should be encouraged to adopt on-line web-based noise declaration programs and to put less effort into physical labeling programs.

The third presentation was by Jean Tourret who spoke on "The need for noise policies for developing countries." He pointed out that there are many problems in more developed countries with the implementation of noise policies, and one can imagine that there are many more difficulties in implementation of policies in less developed countries. In particular, these countries may have different needs, and adaptation of policies appropriate for developed countries may be needed. He gave three examples of different situations. In large countries such as Brazil and India there is the technical knowledge needed to

support noise policies, and these policies are generally directed towards specific needs such as transportation and defense. Other developing countries within the EU can generally follow EU requirements. Then there is a third group of countries with limited technical knowledge and little in the way of noise policies.

He raised the question of the need for noise policies in developing countries, and gave an example of one case where other problems such as air and water pollution and waste management have a much higher priority. Still, he said, needs exist even though they are not now of high priority.

He discussed the need for control of occupational noise in developing countries in view of the fact that much of the world's manufacturing is being transferred to these countries. He said that developing countries may purchase used equipment or low-cost equipment that may not have low noise emissions. He said that it is quite difficult to obtain data, and in any case, management may not want to impair production to achieve low noise levels.

For such countries, he said, a policy for new factories and for large companies based on the following could be imagined.

- Information on "reasonable" targeted values,
- a progression of requirements with time concerning noise imission at the work place,
- a progression of requirements with time concerning noise emission by machines, and
- new requirements on reduced reverberation in buildings.

He then turned to community noise in developing countries. He said that whereas 20% of European citizens are highly annoyed by noise and 40% are significantly annoyed, it is very difficult to obtain statistics in developing countries. Citizens may accept high noise levels as a consequence of progress, so it may take a long time for a need for quiet to develop. In any case, there is generally a lack of knowledge in developing countries of the effects of noise. He commented that a major noise source is traffic noise and offered several suggestions about how this noise may be reduced.

With regard to consumer and other products, he said that many low noise products are being designed and manufactured in developing countries to meet international requirements. There is, therefore, an internal benefit as well as a benefit to countries that receive exports. There is a need, he said, for a simplified labelling procedure, but no need for a specific policy concerning these products.

He then turned to methods to assist developing countries with regard to noise

policy. Noise policies for developing countries should:

- be adapted to each country or group of countries in similar situations,
- be "declared" and promoted on an official basis,
- when possible, rely on an adaptation of a larger document on a global noise policy,
- be as simple as possible,
- be realistic in term of targeted values and thus of requirements,
- be based on step-by-step improvement, and
- focus on new situations or projects

He then presented some ideas that may help developing countries in the implementation of noise policy:

- Document the difficulties and pitfalls experienced by more developed countries in order to avoid useless experiments
- Provide basic information on noise that can be easily translated and disseminated to stakeholders concerning current levels of noise, risks, solutions.
- Provide adapted solutions (information supports, equipments…) to educate a larger population (this could be done through the WHO and also with the support of industrial sponsors working in the field of noise measurement and control)
- Encourage locally the setting up or development of organizations of noise control specialists
- Organize, through I-INCE, working groups and meetings a specific discussion of the issues of developing countries. These could gather information on noise situations and focussed problems, discuss case studies, exchange about costless solutions to solve noise problems, and define some common items for noise policies. Such a meeting could preferably take place in a developing country, for example in the form of an I-INCE Symposium.

The workshop then continued with a question (Q), answer (A), and comment (C) session. Because of space limitations, the material below is only a portion of the discussion, and the discussion is not presented in the order in which it occurred.

## Developing Countries

**Q.** Dr. Tourret, you gave us several options for assistance to the developing countries. What do you consider is the very first step? Not all can be accomplished at once for the developing countries; and, of the very many different proposals that you presented to us, what do you consider to be the first step in a country such as Egypt where there is very little activity at this time as far as noise control is concerned?

**A.** *It depends on whether you're asking about the steps to be taken by the*

*countries themselves or the steps to be taken by International INCE. It would of course be difficult in a country like Egypt to implement a noise policy applied to all domains because there is such a gap between what can be written in terms of objectives and what will be the reality in terms of achievements. I think the first thing that I-INCE can do is to supply basic information that could be disseminated through the stakeholders and through the educated people.*

### Labeling codes

**Q.** Mr. Berry, what are your thoughts on labeling noise levels with a color code as energy is labeled in the EU?

**A.** *A label should be as simple as possible, especially for the average consumer. The more effort we can put into the process of educating people, the more aware the public will be. These descriptions have to be simple. A color code would avoid the issue about whether or not people understand decibels.*

*The more effort we can put into the process of educating people, the more aware the public will be.*

### Annoyance vs. health effects

**C.** This discussion shows that advances in reducing environmental and community noise are moving very slowly. In many countries noise is not an issue because there are other more urgent issues. I think that when we are talking about annoyance, that is much too weak an argument. We need to be more aggressive and prove that noise is really a health problem. There are promising results from studies they are doing in Germany now. We need to tell the politicians that freedom from noise is a basic need, not just an annoyance, and that noise can have serious health effects. Then you can move to developing countries and say that noise is important. We have to put a price on the noise and tell what the real cost to public health is. If we cannot do that, we will make no progress.

### Annoyance

**C.** We are still not doing enough on annoyance studies. An international standard technical document was developed by a working group to produce a standardized questionnaire for annoyance studies. This was done because it was necessary to compare different surveys in different countries to produce a harmonized result. Unfortunately, it is another one of those cases of getting the information through to the people who can make use of it. So there's a technical report published by ISO which contains such a survey. As with all documents of this nature, though, it could be improved.

### Puerto Rican policy

**C.** The Environmental Quality Board of Puerto Rico has directed a committee to develop a national noise action plan for the island. We're knocking on the doors of all the agencies to assist us.

### Chinese market

**C.** The driving force behind noise policy is not money, not government, not politicians, but the market and the consumer. Regarding consumer product noise in China, as of the first of this year, any refrigerator without a noise label can no longer be sold on the market in China. A number is required on the label, the noise-efficient sound power. The noise power of air-conditioners and refrigerators in China has already become a most important consideration for consumers today. So the problem for the manufacturer is that they have to reduce the noise to sell their products.

## Session 2

The first speaker in the second workshop session was Lex Brown who spoke on" Community Noise: How do we get some political traction?" He began by showing information on the noise exposure from traffic of dwellings in the city of Gold Coast, Australia for the year 2000 ($L_{10}$ data for 18 hours). As an example, 7701 dwelling units (about 4% of all dwellings) were exposed to A-weighted levels greater than 68 dB in 2000, and the number of dwellings exposed to this level in 2021 is projected to rise to 8382. Technical solutions, he said, are known—current strategies for control of traffic noise include reduction of vehicle noise emissions and roadside barriers. Many other strategies, he said, have been known for many years, but with little effect. These include:

- Building envelope protection,
- traffic management,
- development/land use control,
- road surface treatment, and
- compensation.

He gave two reasons why we have not succeeded in the establishment of a noise policy: there needs to be a political commitment, and the focus has always been on annoyance. A change of approach, he said, is needed because annoyance has never had (and never will have) political traction. He offered three complementary alternatives:

- Noise limits based on sleep disturbance,
- noise limits based on health effects, and
- preferred soundscapes rather than noise limits.

He contrasted the goals of soundscape design vs noise control, and said that whereas soundscape design is positive (sounds of preference; sound as a resource), noise control is negative (sounds of discomfort; sound as a waste).

Sound as a resource, he said, can be a catalyst for several developments:

- A much-needed reinvigoration of managing sound in the urban

environment,
- spreading responsibility for the urban acoustic environment to a much wider range of professions (planning, landscape design, architecture, housing), and
- political commitment.

The next speaker was Alain Depitre who spoke on "Aircraft noise certification and airport local noise rules." He began by discussing the role of the International Civil Aviation Organization (ICAO). The organization, he said, carries out its environmental work through the Committee on Aviation Environmental Protection (CAEP) which is a technical committee of the ICAO Council. CAEP has 21 members and 12 observers. ICAO itself, he said, has 188 contracting states.

He discussed the ICAO procedures for aircraft noise certification. For jets and heavy propeller planes, there are three certificated noise levels, two for takeoff and one for approach. The certificated levels depend on the mass of the aircraft and are in terms of Effective Perceived Noise Level (EPNL), a metric that includes adjustments for both spectral irregularities and the duration of the noise.

He then turned from certification issues to the noise around airports. If each airport has its own noise rules derived from noise measurements around the airport, it will cause difficulties for the airlines, he said. Measured noise levels are generally expressed in terms of a different metric, A-weighted sound level, and these A-weighted levels are not linked to the certificated levels in EPNL. He said that measurements by the Direction Générale de l'Aviation Civile (DGAC) in connection with setting noise limits around the Charles de Gaulle airport (CDG) showed that there can be problems connected with setting limits based on measured levels, and that the same aircraft may produce different levels on the ground on different days. Thus, the same aircraft may meet the local rule on one day and not meet it on another. He urged that local noise rules be based on certificated levels and not on measured levels around the airport, and said that this is, in fact, required by an EC Directive (2002/30/EC).

ICAO and CAEP have, he said, developed "The Balanced Approach," a method to address aircraft noise problems around individual airports in an environmentally responsive and economically responsible way. The approach, he said, has four key elements:
- Reduction of the noise at the source,
- land use planning and management,
- noise abatement operational procedures, and
- operating restrictions on aircraft.

He then turned to applications of airport noise control in France and gave several examples for Paris-CDG:
- Landing is forbidden between 0h30 and 5h29 to aircraft for which the certificated noise levels for approach is greater than 104.5 EPNdB
- Take off is forbidden to aircraft between 0h and 4h59 for which the certificated noise level for flyover is greater than 99 EPNdB
- Between 6h 15 and 23h30 no landing for aircraft with margin < Chapter 3 limit – 8 EPNdB
- Between 6h and 23h15 no takeoff for aircraft with margin < Chapter 3 limit – 8 EPNdB

He said that noise restrictions are in place for the following airports:
- Paris - Orly airport
- Nice Côte d'Azur
- Paris – le Bourget
- Toulouse – Blagnac
- Lyon – St Exupéry
- Bâle-Mulhouse
- Beauvais – Tillé

The next speaker was Volker Irmer. The title of his talk was "European legislation on outdoor equipment noise." He gave the basic requirements contained in the European Directive of 2000 May 08, 2000/14/EC, "On the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors." The noise emission requirements, he said, are in terms of sound power levels. The directive applies to four types of equipment:
- construction equipment
- garden equipment
- municipal vehicles
- other

He said that the standard follows a "market access" strategy in the sense that:
- Equipment covered by the Directive may only be put on the market in Europe, if the provisions of the Directive are fulfilled.
- Manufacturers from outside the European Communities have to fulfil the provisions putting them on the market in the European Communities
- European producers may sell equipment not fulfilling the provisions of the Directive outside the European Communities.

The next speaker was Carlos Grandi who spoke on "Requirements for aircraft interior noise control." He spoke of targets for both exterior and interior noise, and the drivers for the setting of market requirements. He said that there are no requirements on interior noise (*For standards on interior noise, see A.H. Marsh, INTER-NOISE 04 paper No. 218.—Ed.*), and that market requirements for interior noise depend on the type of aircraft (commercial or executive jet), and the duration of the flight. He said that interior A-weighted levels of 75-85 dB are reasonable, with lower levels for longer flights on executive aircraft. He then turned to certification requirements for exterior noise and showed a chart of certification levels vs time for the years 1960 to the present. All modern aircraft easily meet Chapter 3 (Stage 3) requirements, and will meet a proposed Chapter 4 (Stage 4) requirement. He also

discussed ground operating requirements and said that marketing requirements are well below ICAO Annex 16 requirements. He then gave a brief description of the technical factors that influence the design of aircraft for both exterior and interior noise requirements.

The workshop then continued with a question (Q), answer (A), and comment (C) session. Because of space limitations, the material below is only a portion of the discussion, and the discussion is not presented in the order in which it occurred.

## Soundscapes and emission control

**Q.** Dr. Brown, how will a change to soundscapes affect source control policies?

**A.** *I don't think we will have many problems with source control policies. The problem is that we specify what emission levels should be and have no way of checking unless we get strong political commitment. So I don't think that this will have much effect at all on source control policies.*

**C.** I think that competition is good for manufacturers. The emission noise control policies are insufficient at the present time.

**C.** I had the same question. What difference would it make if we took a positive approach to emission control? The politicians who work locally and those who work on a national or an international level and who are responsible for policy can do a lot about emission. That is the critical step that must be taken to get emissions down by a substantial number of decibels compared to what we have today. What influence can we have on national and international conditions?

Dr. Brown said it is important to point out that, as a resource, the soundscape is in addition to what we are now doing; it is not a replacement. So we must add the soundscape as a new dimension. We must add this dimension to involve the politicians, the urban designers, and the planners. As far as road traffic noise and the noise of motor vehicles is concerned, there are a number of reasons why lower noise levels have not been achieved. There is an inaccurate correlation between road traffic noise and the types of tests we carry out. The influence of roadway surfaces must be considered in addition to the noise control of vehicles. I have no confidence whatsoever that we are going to achieve through emission control a substantial reduction of urban noise.

*it is important to point out that, as a resource, the soundscape is in addition to what we are now doing; it is not a replacement.*

**C.** In Sweden we have a program we've been running now for over 5 years titled, Soundscape Support to Health. It is very much in line with what you say; but when we started this program, we had the same idea as yours. We are now in the middle of the program, and we realize that it is not possible to solve the problems purely by looking at the soundscape from an immissions point of view. We need to have something done on the emissions side as well and exert more pressure on those responsible. I think we jumped over a few things you had in the beginning of your presentation, and I'd hoped you would say a bit more about the need to show the effects of noise on health, not just on annoyance. I have talked to politicians, and they tell me the same thing: "We'll start doing something if you can show that people die from noise." So I think that one of the key issues is, "Can we prove that noise has an adverse health effect?"

## Limits and restrictions

**Q.** Dr. Brown, we have to consider a soundscape approach as much as possible. But if that is not sufficient, we need to enforce limits. Let us look at other fields where limits and restrictions have been successfully applied. How about the limits on road vehicles?

**A.** *For more than forty years we have had good data on the effects of road traffic noise on people. Stockholm has a map dated in the 1970s showing the exposure of the dwellings to road traffic noise. Since then we've done a lot of work on vehicle noise control. But why aren't we winning? Why are we unsuccessful? Why are the transport lobby and the vehicle lobby so strong in rejecting controls on motor vehicles when the community lobby has a compelling argument but is not winning? So all I'm asking is "Why?" The answer is that we are not capturing the imagination of our decision makers. We are using the term "annoyance," and, in the eyes of the decision makers, it is women and grumpy old men who complain, who are annoyed and they don't really matter. We are not conveying to the decision makers how important road traffic noise pollution is and how it has such an enormous effect on quality of life. We have to find some way to tackle this situation, perhaps by getting away from the use of the word "annoyance." Soundscapes are another way to capture the imagination. Consider how "sound quality" has captured the imagination of manufacturers who are designing "quality" sound into vehicles and products. I'm suggesting that soundscape design should attempt to instill the concept of sound quality in the domain of external spaces—sound quality of urban space. As part of urban renewal, we build new city halls, large shopping centers, and urban complexes. This construction presents opportunities where we as noise professionals should be working with professionals in the other disciplines*

*involved. We should say "Let's produce high sound quality in these spaces." That might capture the imagination. Isn't that better than saying "Make sure the noise does not exceed this level or that level?"*

**C.** As those sponsoring one of the programs I've been involved with required that we go public with what we are doing. As a result we attracted the interest of several news magazines in Sweden. There was an article on this program in a leading magazine which is bought by housewives. At the end of the article the author wrote that, if you have a noise problem, you can call a telephone number—my telephone number! I didn't write the article; somebody else did. There was a tremendous response; my telephone was immediately busy; and I am still getting calls even though the article was published more than a year ago. The callers complain about the traffic noise problem, and they refer to this article. Some have been to the barber shop and found an old magazine with the article in it. We need pressure from ordinary people who are the owners of the problem—the ones who are actually disturbed. And if this pressure is intense enough, the politicians will become interested. We should be working to get more articles of this kind in popular magazines.

*We need pressure from ordinary people who are the owners of the [traffic noise] problem—the ones who are actually disturbed. And if this pressure is intense enough, the politicians will become interested.*



## ICAO and the UN

**Q.** Dr. Depitre, is there a relationship between ICAO and international bodies such as an agency of the United Nations?

**A.** *Yes, ICAO is a specialized agency of the United Nations linked to the Economic and Social Council (ECOSOC). There are 189 countries that, as Contracting States of ICAO, have subscribed to the Convention on International Civil Aviation (also known as the Chicago Convention).*

## Emission test results

**Q.** Dr. Irmer, what test results will be accepted in Europe according to European law?

**A.** *If you only have to put a label on a machine or a product, you may do this. If there is an upper limit prescribed for this product or piece of equipment, you must go to a third party. There is a list of 30 or 40 third parties on the website of the European Commission, and you have to go to one of these bodies to have your product approved for sale.*

**Q.** Dr. Irmer, the EU Directive 2000/14/EC and the Machinery Directive are a step forward. What can we do to control their implementation? We know of few cases where the emission values specified have been controlled and where lack of conformity has led to the products being removed from the market.

**A.** *I know that at least in Germany we have limited market surveillance. The authorities merely look at the labels on the product. But this can only be a first step. The remark was just made that there should be mutual control between the manufacturers. I don't think this really works. I know from ten years ago that one manufacturer said "This product of yours doesn't meet the limits." And the other said "Yes, I know, but . . . ." And they never really did anything.*

**C.** What has happened in Europe is that some countries have rather strict legislation that is taken very seriously. I

can mention the UK as one of the very few. But we have the same problem there as everywhere else in the EU, and that is that we don't have any strength on the buyer's or user's side. As you say, we would have thought that competitors would look at each other. But if they can get rid of a competitor's product, and they certainly can if they can show that it doesn't comply, they are afraid of what happens to them the next day. How can we stimulate some kind of consumer strength in emission control as well as immissions? We need pressure from the users.

**C.** Sadly, we don't have a real method to look at whether the guaranteed noise level is the right one because we don't have any uniform policy on product emission measurements throughout Europe. Each of the member states prescribes their own measurements. For example, a product may be labeled at 94dB in the UK, at 96dB in Germany, and at 90dB in Italy; and all of the results are correct because they have different measurement requirements.

*Sadly, we don't have a real method to look at whether the guaranteed noise level is the right one because we don't have any uniform policy on product emission measurements throughout Europe.*

## Session 3

The first speaker in the third session of the workshop was Elliott Berger who spoke on "Hearing-protection related issues, product labeling, and current OSHA activities." He started by pointing out that all current noise regulations in the US specify the use of hearing protectors, and that while engineering controls are the preferred method for controlling the noise exposure of workers, industry currently relies on hearing protectors. This is in spite of the fact that these devices often fail to protect hearing and their performance often falls far short of expectations. He showed a chart of labeled vs field values of the noise reduction rating (NRR) for a variety of devices. Field performance often falls 10 dB or more below the laboratory rating.

Another issue, he said, is that workers often do not wear hearing protection 100% of the time. This can be quantified by calculation of a time corrected NRR that depends on both the NRR itself and the percentage of the time the device is worn. For example, the time-corrected NRR is only about 4 dB for a device having an NRR of 15 dB worn 50% of the time.

He gave an example of a hearing protector label currently required by the US Environmental Protection Agency (EPA), and said that because of current problems with the NRR and its application to modern hearing protective devices, there is action to improve the situation. The US EPA sponsored a workshop in 2003 March, the problem has been studied by a committee of the American National Standards Institute (ANSI), and there has been an inter-laboratory study by the EPA and the National Institute for Occupational Safety and Health (NIOSH). A new rule is being written, and should be available for public comment by late 2005 or early 2006.

He reviewed regulatory activites related to noise in the Occupational Safety and Health Administration (OSHA), the Mine Safety and Health Administration and the Federal Railroad Administration.

He also said that there is federal activity on the recording of work-related, noise-induced hearing loss in industry, with the goal of capturing statistics on the trends in industry. One unexpected consequence of this activity, he said, is that industry appears to be "off-loading" employees from hearing conservation programs.

The next speaker was Wolfgang Probst who spoke on "Noise prediction and noise mapping for improved planning." He began with a brief discussion of propagation from a source to a receiver taking into account the effects of diffraction and reflection. He then showed how a line source, such as a line of traffic on a busy highway, can be partitioned into a series of point sources. Then, using the propagation model, the noise level at a receiver can be calculated using superposition.

He then showed how multiple sources in a community can be used to determine the noise level at one receiver point. Having done the calculation for one receiver point, he extended the work to a large number of receiver points on a 10-meter grid, and showed a noise map with various levels assigned different colors. One task that must be done is to determine levels on the façade of complicated building geometry, and he presented data on a number of building shapes to illustrate how this can be done.

He showed how these calculations can be applied for planning purposes using as an example the calculation of noise radiated in and from a car production facility with a very large number of sources. The factory itself can then be considered as a very complex sound source and the data imported into a city model to calculate the noise levels in the city due to the car factory. Such calculations, he said, are an important planning tool.

The final panelist in the workshop was Stephen Keith who spoke on "Health Canada's approach to occupational and community noise." He began by describing the Canadian agencies involved with noise regulation and enforcement. Health Canada regulates machinery noise emissions whereas the Treasury Board standards

regulate the noise immissions of Federal Government workers and the Canada Labour Code regulates the noise immissions of workers under federal jurisdiction. Provincial regulations may differ. Within the Federal government, Health Canada is one source of expert advice.

Enforcement under Federal jurisdiction is the responsibility of several agencies:

- Human Resources and Skills Development Canada (general operations)
- Transport Canada (aircraft, rail, marine operations)
- Health Canada (Treasury Board standards, machinery emission)
- National Energy Board (energy industry operations)
- National Defence (military operations)

With regard to community noise, Health Canada is the source of expert advice on the health effects of noise for projects under Federal jurisdiction, and is responsible for the regulation of product noise. Transport Canada regulates motor vehicle noise, and military noise is regulated by National Defence. A variety of agencies is responsible for environmental assessment depending on the particular situation. Agencies involved include:

- Transport Canada
- Canadian Transportation Agency
- Natural Resources Canada
- Public Works and Government Services Canada
- Indian and Northern Affairs Canada

Surveys in Canada have shown that between 6.7% and 8% of the citizens are highly annoyed by traffic noise.

Health Canada has significant involvement with standards-setting organizations and research on noise measurement methods. In particular, there is a Canadian standard, CSA Z107.58-02, Noise Emission Declarations for Machinery, a document based on ISO standards and consistent with the European Union Machinery Noise Directive, 98/37/EU. The organization also provides support regarding community noise through participation in the development of standards and national guidelines for environmental noise assessment—particularly in the health effects of noise.

> *"Employers and workers need to stop buying new noise problems."*

Occupational noise reduction, he said, starts with the purchase of quiet machinery.

*"Employers and workers need to stop buying new noise problems."*
*—Occupational Health and Safety Code Explanation Guide*
*(Government of Alberta, Human Resources and Employment)*

He noted that Health Canada views some of the I-INCE proposals such as the 85 dB(A) with 3 dB exchange rate recommendation as a long term goal. Health Canada recognizes that different jurisdictions within Canada have different noise limits. If engineering controls are not feasible, occupational noise legislation in Canada relies on hearing protective devices.

The workshop then continued with a question (Q), answer (A), and comment (C) session. Because of space limitations, the material below is only a portion of the discussion, and the discussion is not presented in the order in which it occured.

### Occupational – hearing protective devices

**Q.** Dr. Berger, it is very nice to design and implement new U.S. regulations for hearing protective devices. Do you, however, agree that it should ideally be a matter of global harmonization?

**A.** *Ideally I would agree that it should be a matter of global harmonization, and there is an effort ongoing in*

*ISO/TC43/WG17 to develop another standard for measuring hearing protection performance. ISO 4869 Part 1 is the analog to the U.S. version of the real- ear attenuation and threshold measurement procedures which addresses a laboratory scenario. Part 7, analogous to the newer U.S. standard and more of a subject-fit approach, is currently under discussion and may go out forto vote next year. Australia and New Zealand use a standard that is essentially the same as the subject-fit procedure now used in the U.S. Brazil uses that type of procedure right now. So there is disagreement worldwide over whether, in a laboratory, we should have an ergonomic approach that tests people in ways that simulate what they might expect in the field or whether we should test them in ways that give more of an optimum performance rating.*

*. . . there is disagreement worldwide over whether, in a laboratory, we should have an ergonomic approach that tests people in ways that simulate what they might expect in the field or whether we should test them in ways that give more of an optimum performance rating.*

## Noise reduction rating

**Q.** Dr. Berger, is the $NRR_{SF}$ a replacement for the $NRR_{SA}$?

**A.** *There have been many noise ratings proposed both in the U.S. and worldwide. In the U.S. we currently use the NRR as I showed you in the label. The $NRR_{SA}$ is a new proposal that has not been implemented at this time. The $NRR_{SF}$, standing for subject-fit, has been discussed for about ten years in the U.S. and has been recommended as an alternative to work with subject-fit-type data. In Brazil all testing is done to the subject-fit procedure and numbers now recorded are $NRR_{SF}$ numbers. In the U.S. few people use them. Some U.S. manufacturers make them available if people request them. The work that my working group produced for the $NRR_{SA}$ method suggests that this is a more effective approach; it's similar to the $NRR_{SF}$ method. The biggest difference between the two has to do with the commutation and the precision of the estimate and also the fact that instead of having a one-number rating, there is this range of numbers which we feel is a better representation. But having two numbers on the product makes it a bit more difficult if you are going to focus on the single-number rating and perhaps causes people to concentrate on other issues such as whether the device is comfortable or whether it is ergonomically appropriate.*

## Trading relationship

**Q.** What is likely to happen in attempts to harmonize the 3 dB/5 dB trading relationship?

**A.** *Regrettably I think it is highly unlikely that the U.S. will move from the 5 dB to 3 dB trading relationship. This subject was hotly debated in the 1970s. The Mine Safety and Health Administration (MSHA) promulgated its noise regulation in the year 2000 that followed ten years of testimony and much debate. There was the hope that MSHA would break from the Occupational Health and Safety Administration (OSHA) position and support the 3 dB exchange rate. That didn't happen. It is unlikely that OSHA will reopen the exchange rate issue. There were approximately 40,000 pages of testimony during the ten-year period in the 1970s when they developed their hearing conservation program.*

**Q.** Dr. Berger, what is the position of the National Institute of Occupational Safety and Health (NIOSH) on the 3 dB versus 5 dB trading relationship if they have one?

**A.** *NIOSH does have a position, and they are strongly supportive of the 3 dB exchange rate. NIOSH published a criteria document in 1998 with a number of recommendations for what they felt would be effective for a hearing-conservation program. The hope was that this would influence what MSHA would chose to do. After all, NIOSH is the scientific advisory institute for the government. MSHA implemented some of the NIOSH recommendations and not others; they did not implement the 3 dB. NIOSH continues to be strongly in favor of the 3 dB exchange rate, but I don't see this as having substantial impact in the next five to ten years.*

## Noise maps

**Q.** Dr. Probst, what kind of validation is available on your predictions? How accurate are they? How are noise maps used, if at all, in North America?

**A.** *Validation is very important. For the project in the area of Stuttgart Airport, we predicted the levels at fifty positions that were compared with measurements made at the same locations over a period of fourteen days. Of course, there are different traffic flows and different flight patterns at the airport depending upon the month of the year. But we compared the predicted and measured values over this fourteen-day period without recalculating for other months of the year. During this time, more than 60 percent of all the predicted levels predicted were in the range of 0 to 3 dB of those measured. It depends on the standard that you use; you must take this into account.*

**C.** Regarding this question I would like to know which calculation method was used. At the moment many European

countries have different computation methods, and you get different results from the mapping exercises. The European directive recommends that the member states use maps that have been documented and where guidelines are available. For the future, the EU has a program to develop better methods; but that is still a long way off. For the short term it is important for the inter-comparison of the data to have at least a standardized method.

**Q.** Dr. ten Wolde, have the results of two or more prediction programs been compared for the same agglomeration in the EU?

**A.** *At the moment many of the member state's have different calculation methods for industrial noise, road traffic noise, and other outdoor noise differ from the calculation methods of other states. So basically you cannot compare the results of different calculation methods. The text of the directive is such that the member states may continue to use their own methods provided that their results are not different from the results of the recommended mapping procedure. Regarding the uncertainty in the results, it is true that a considerable part of the uncertainty is due to the assumptions in the modeling of the environment.*

# Asia-Pacific News

Marion Burgess, Asia-Pacific Editor

## Australia

### Music Harmony Plan

After more than two years of debate and discussion, Brisbane City Council has formally adopted its Valley Music Harmony Plan in a bid to help ensure the Fortitude Valley live music scene remains "loud and proud". In announcing the move, Brisbane Deputy Mayor David Hinchliffe said the plan represented two years' hard work by residents, the music industry (including Q Music), business people, Council officers and the Liquor Licensing division.

The Valley is a popular and vibrant area, including nightclubs, live music venues, restaurants, cafes, shops and residents. These different land uses have caused conflict between residential and entertainment users. To balance the area's value as an entertainment precinct with the needs of Valley residents and other commercial interests, the Council prepared the Music Harmony Plan. This defines the special entertainment area with different noise criteria than elsewhere but this is not a "blank cheque" for venues to emit unlimited noise levels. In addition all new developments will be required to incorporate a high level of noise insulation.

**For more information http://www.brisbane.qld.gov.au and do a search on *Valley Music Harmony***

### Excellence in Acoustics Award

CSR Braford Insulation sponsors the Annual Excellence in Acoustics Award on behalf of the Australian Acoustical Society (AAS). This award aims at fostering and rewarding excellence in acoustics with the entries judged on demonstrated innovation. The selection panel comprises two from the AAS and two from CSR Braford Insulation. There is a two stage assessment process. First is a concise written submission from which a short list is selected. These are invited to present to the selection panel. The 2005 award will be made at the AAS annual conference to SoundScience@WM Pty Limited for their development of the *Barn Owl Real Time Directional Noise Monitoring System.* The name for the system came from the observation that barn owls are famous for their ability to locate the direction of a sound. They can hunt in total darkness, using acoustic cues to find their prey and the noise measurement system goes some way toward emulating this legendary performance. The system uses three microphones arranged in an equilateral triangle. Cross-correlation functions are formed between each of the three microphone pairs, and all local maxima in these functions are found. An algorithm then searches for sets of three maxima which could all represent a source in approximately the same direction, and at the same distance. The computed noise levels from all sources within a specified range of angles are accumulated, giving an estimate of the total $L_{Aeq}$ noise level arriving at the monitor from that direction. Results in real time are presented on a "radar" type display which allows for easy interpretation. The system has been validated for open sites for industrial and mining noise sources. The award of 2,500 AUD will contribute to validation of other situations.

## Japan

### Japan's Noise Descriptor for Aircraft

It has been 32 years since Japanese environmental quality standards for aircraft noise was first established. As a noise descriptor, WECPNL has been used from that time for assessing the environmental quality at around airports. *(For a description of WECPNL, see www.env.go.jp/en/lar/regulation/aircraft.html.—Ed.)* So far, there is no problem reported for carrying out noise monitoring, however, some discussions are arising recently. It was in 2004 when an unexpected noise data was reported from a local authority that is responsible for monitoring the aircraft noise around Narita International Airport. Before that time, on April in 2002, a new runway (runway B : 2180m) was completed in parallel to the main runway (runway A : 4000m), and it opened to take-off and landing operations for middle type aircrafts such as A310, B767, B777 etc. After the opening, Narita's total air traffic increased up to 30%. Then, noise measurements were carried out and the values of WECPNL were determined at locations around the airport. In addition, WECPNL was separately determined for each set of traffic, i.e., that of runway A and B. This was to clarify the noise contribution from the new runway. Due to the increase in the number of operations, the environmental noise showed increased slightly, however, some strange

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*Japan's aircraft noise metric may be revised*

## USA

### NASA Acoustical Testing Laboratory Celebrates Fifth Anniversary

*NASA Glenn Acoustical Test Laboratory: Happy Anniversary!*

The Acoustical Testing Laboratory (ATL) at the NASA Glenn Research Center is celebrating its five-year business anniversary with an updated and expanded website: **http://acousticaltest.grc.nasa.gov.**

As NASA redirects the Agency's focus from microgravity research on the International Space Station to longer-term space exploration projects, ATL is adapting to this change with a refocus of its mission. In particular, a suite of occupational hearing conservation products and services for NASA and external clients is being expanded. The laboratory is also establishing a collaborative fan characterization and design program with acoustics colleagues in the NASA aeronautics community, which is intended to lead to the establishment of partnerships with the commercial products industry. ATL is pursuing internal and external business opportunities in both of these areas while continuing to offer the manned spaceflight community customized low-noise design consulting, testing, and training services.

Some milestones in the history of the Acoustical Testing Laboratory:

- ATL's accreditation in 2003 by the National Voluntary Laboratory Accreditation Program for ANSI S12.54 and ISO 3744, and in 2004, a zero-deficiency reassessment during which ISO 11201 was added to the laboratory's scope of accreditation.
- Comprehensive support for the low-noise design effort on the International Space Station's Fluids and Combustion Facility, including stakeholder training, expert consulting, and an aggressive acoustic emissions test program. This effort culminated in successful acoustic emissions verification testing in early 2005, using a test procedure that incorporated ISO 11201 to meet NASA's acoustic emissions requirements.
- In collaboration with Nelson Acoustics, the development of a suite of low-noise design training courses for payload developers and other manned spaceflight stakeholders as well as ground support personnel, which have been offered annually for GRC's payload developer community.
- Acquisition of a fan test plenum and, in collaboration with external consultant partners Jeff Schmitt and David Nelson, the development of the capability of simultaneously characterizing the aerodynamic performance and noise emission of cooling fans for space flight hardware and commercial products, in accordance with ISO 10302.
- Sponsorship of NOISE-CON 2003, including the conference technical seminars and technical tour, which featured ATL's collaborators and external partners. A significant number of papers presented at NOISE-CON were contributed by ATL's collaborators.
- Establishment of an occupational hearing conservation business segment under the umbrella of the ATL, focused initially on providing support for NASA's International Space Station and Flight Crew Hearing Conservation Program, in collaboration with the Audiology and Hearing Conservation Clinic at NASA Johnson Space Center. This effort, which has been extended to programs for ground-based personnel within NASA and the larger hearing conservation technical community, incorporates the development of hearing conservation training services for medical professionals and other program stakeholders and the development, production, and broad (internal and external) distribution of free training resources, available through the ATL website.
- The development and release of *Auditory Demonstrations II* in 2004 and the anticipated release of *Animated Auditory Demonstrations II* in early 2006. The animations will provide a visual means for tracking subtle changes in the audio signal while providing an entertaining contextual setting for the vignettes.
- Release of *JeopEARdy*, a PowerPoint-based training resource for hearing conservation educators, in early 2004. *JeopEARdy* accompanied the development of highly-acclaimed "train the trainer" workshops for hearing conservation educators.
- Release of a beta version of *MACSUG*, an audiometry teaching software package, in late 2003 and the expected release of the final version as an ATL outreach product in early 2006.
- Mentorship of summer interns for the past five summers, which resulted in the development of

a scanning sound intensity measurement system and a portfolio of application-specific medical illustrations for ATL's hearing conservation outreach and training efforts.

For more information, contact Beth Cooper, Manager, Acoustical Testing Laboratory, NASA John H. Glenn Research Center at Lewis Field, M.S. 86-10 21000 Brookpark Rd., Cleveland, Ohio 44135. Telephone: (216) 433-3950; e-mail: Beth.A.Cooper@nasa.gov or visit **http://acousticaltest.grc.nasa.gov**

### The RH Lyon Division of Acentech is Formed

Acentech Inc. of Cambridge, MA, announces its new RH Lyon (RHL) Division, which consults in product noise quality, machinery diagnostics, active noise and vibration control, and gives seminars at MIT. Designing and engineering products for sound, vibration, and reliability is RHL's forte. These areas of expertise complement Acentech's long-standing services in architectural acoustics, audio-visual system design, information technology, and transportation, community and industrial noise control.

RH Lyon has been a leading resource for industry for over 30 years. Notable clients include Ford Motor Company, Gillette, General Electric, Raytheon Corporation, Smithsonian Astrophysical Laboratory, and Xerox Corporation; typical clients include product manufacturers and design firms. Acentech President Christopher Savereid sees the addition of the new RH Lyon division as part of Acentech's on-going effort to broaden its already diverse and inclusive acoustics consulting services.

Acentech is the largest multi-disciplinary acoustical consulting firm in the United States, providing services in architectural acoustics, noise and vibration control, sound system design, audiovisual system design and information technology infrastructure. Acentech has offices in Cambridge, Massachusetts, Trevose, Pennsylvania, and Thousand Oaks, California.

### The Second Edition of Noise and Vibration Control Engineering is Published

*Noise and Vibration Control Engineering: Principles and Applications, Second Edition* has now been published as a resource of critical noise control design information in one concise volume. Presenting the latest information on commonly found noise and vibration problems, this Second Edition has been thoroughly updated and reviewed by editors István Vér and Leo Beranek, who compiled new as well as fully revised chapters on the latest developments in the field, written by many well-known specialists in the field. New material includes:

- Noise generation
- HVAC systems
- Active noise and vibration control
- Sound absorbing materials and structures
- Outdoor noise propagation
- Criteria for noise control in buildings
- Passive silencers
- Acoustical standards

A review of the book will be published in the December issue of this magazine. The International Standard Book Number (ISBN) for this volume is 0-471-44942-3. The publisher, John Wiley and Sons, can be contacted at Wiley Customer Care, 10475 Crosspoint Blvd., Indianapolis, IN 46256, USA.

## Asia-Pacific News *continued from page 97*

results were reported. It was shown that some data of WECPNL that included the traffic of two runways (A+B) were smaller than that for one runway (A). If we consider the energy base theory, this result is unreasonable. However, the possibility of this inversion exists in Japanese WECPNL. The Japanese calculation procedure is a simplified version that derived from a document issued from ICAO in 1969. Many acoustical engineers accepted the inversion, because the difference was within 1 dB and it may have arisen in an error of the approximation procedures. However, the inversion was reported as a serious problem in Japanese newspapers. The Ministry of the Environment started setting up a technical committee in the Institute of Noise Control Engineering of Japan for this problem and started discussion for a new metric that is adequate to the environmental noise policy for air traffic in Japan.

*RH Lyon Corp Joins Acentech, Inc.*

Information on Low Frequency Noise from Defra

## BELGIUM

### ISMA Noise and Vibration Engineering Conference

The next ISMA Noise and Vibration Engineering Conference will be held in Leuven (Belgium) from 18 to 20 September 2006. The conference is organised by the division PMA of the K.U.Leuven.

ISMA2006 is part of a sequence of annual courses and biennial international conferences on structural dynamics, modal analysis and noise and vibration engineering. The last conference was organised in September 2004 and was attended by more than 450 people. The technical program included 2 keynote lectures, 3 tutorial lectures and about 300 technical papers scheduled into 7 parallel tracks and 4 plenary poster sessions. Full CD-ROM conference proceedings were published.

*For more information, contact the ISMA Conference secretary : Mrs. L.Notré, K.U.Leuven, PMA Division, Celestijnenlaan 300B, B-3001 Heverlee, Belgium.*
*Tel: (32) 16322482, Fax: (32) 16322987*
*e-mail : mailto:lieve.notre@mech.kuleuven.be*
*The ISMA website is www.isma-isaac.be*

## FINLAND

### Euronoise 2006 to be held in Finland

Euronoise 2006 will be held in Tampere, Finland on 2006 May 30-June 01. The meeting is being organized by the Acoustical Society of Finland, VTT Technical Research Centre of Finland and the European Acoustics Association. The conference is open to all topics in noise control. In addition, the theme "Advanced Solutions for Noise Control" will be emphasised in the lectures and sessions.

The conference venue, Tampere Hall, is located in the city of Tampere, Finland's second largest urban area. Tampere Hall is a modern conference centre and is at a walking distance of most of the conference hotels. Tampere is situated between two large lakes that grace the city with their beauty and provide water-based recreational opportunities. Tampere is the birthplace of industrial activities in Finland.

An exhibition will be held in conjunction with the conference. Interested parties are kindly requested to make reservations with the Conference Secretariat, tel. +358 3 366 4400, e-mail: euronoise2006@tampereconference.fi.

*For more information, go to the conference web site, www.euronoise2006.org.*

## UNITED KINGDOM

### Low Frequency Noise Information from Defra

Defra, the U.K. Department of the Environment, Food, and Rural Affairs, has provided a large amount of information on low-frequency noise—general research articles, criteria, measurement techniques, and assessment methodology.

The following is a summary of the available information—which may be downloaded from the Defra web site: www.defra.gov.uk/environment/noise/research/lowfrequency/index.htm

**A review of published research on low frequency noise.** This report was produced for Defra by Dr. Geoff Leventhall; assisted by Dr. Peter Pelmear and Dr. Stephen Benton. Low frequency noise causes extreme distress to a number of people who are sensitive to its effects. However, there is relatively little information readily available regarding the effects, assessment and management of low frequency noise. This report reviews the available literature in order to better improve our understanding. It should be of interest to low-frequency noise sufferers, health professionals, environmental action groups, local authorities and acousticians.

**Methodology for the assessment of low frequency noise.** The University of Salford was commissioned by Defra to develop a proposed criteria and methodology for the assessment of low frequency noise complaints. Three reports were produced in total.

**Proposed criteria for assessment of low frequency noise disturbance.** This report compares assessment methods from various countries and presents findings

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# International Representatives

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***Asia:*** 01dB Asia Pacifique
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patrice.pischedda@01db.com.my

***Belgium:*** Acsoft Belgique
+32 (4) 366 00 22 • +32 (4) 367 53 74
jean.nemerlin@acsoft.be

***Brazil:*** 01dB Brasil
+55 (11) 5089 6463 • +55 (11) 5089 6454
nicolas.isnard@01dB.com.br

***Denmark:*** Butina & Larsen technic
+45 (44) 48 46 60 • +45 (49) 70 75 90
blt@post8.tele.dk

***Finland:*** Metric Industrial Oy
+358 9 4761 6742
juuso.jaakola@metric.fi

***Greece:*** Dynamic Acoustics N.Kolettis and Cie EE
+30 210 65 61 251 • +30 210 65 61 252
dynac@hol.gr

***Germany:*** 01db GmbH
+49 (3423) 758 657 • +49 (3423) 758 658
grit.mueske@01db.de

***Italy:*** 01dB Italia
+39 (0) 63610954 • +39 (0) 586411209
notini@01db.it

***Netherlands:*** Acoutronics
+31 (162) 42 44 21 • +31 (162) 42 56 52
a.hendriks@acoutronics.nl

***Portugal:*** MRA
+351 21 421 74 72 • +351 21 421 81 88
n.dias@mra.pt

***Roumania:*** Vibrotest
+40 (212) 12 47 12 • +40 (212) 12 47 14
vibrotst@fx.ro

***Russia:*** OCTAVA+
+7 (095) 799 90 92 • +7 (095) 799 90 93
msergeyev@octava.ru

***South Africa:*** Acoustics, Noise and Vibration Consultancy
+27 11 679 2342 • +27 11 679 2342
jhassall@pixie.co.za

***Spain:*** Alava Ingenieros
+34 91 567 9700 • +34 91 570 2661
l.esteban@alava-ing.es

***Switzerland:*** Norsonic Brechbühl
+41 (34) 431 31 21 • +41 (34) 431 31 22
info@01db.ch

***USA:*** 01dB Inc
+1 (248) 592 2996 • +1 (248) 592 2991
dominique.fernier2@01db-metravib.com

***United Kingdom:*** Acsoft Ltd
+44 (12) 96 682 686 • +44 (12) 96 682 860
jshelton@acsoft.co.uk

## ACO Pacific

***Hong Kong/China:*** AP Technology Limited
852 3114 6028 • 852 3114 6038
ManLi88@netvigator.com

***Hong Kong/China:*** Gelec(HK) Limited
852-2919-8383 • 852 2591-0548
alexwu00@hotmail.com

***Korea:*** ABC Trading
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abctrd@abctrd.com

## Data Physics

***China:*** Data Physics (China) Branch
+86-21-621-86533 • +86-21-621-73370
sales@dataphysics.com

***France:*** Data Physics (France) S.A.
+33-(0)1-39-30-50-60 • +33-(0)1-39-30-50-79
sales@dataphysics.com

***Germany:*** Data Physics (Deutschland) GmbH
+49-61-01-50-95-61 • +49-61-01-50-95-62
sales@dataphysics.com

***India:*** Data Physics (Bharat) Pvt. Ltd.
+91-80-656-5810 • +91-80-656-2609
sales@dataphysics.com

***UK:*** Data Physics (UK) Ltd.
+44-(0)1-480-470-345 • +44-(0)1-480-470-456
sales@dataphysics.com

***USA:*** Data Physics Corporation
+1-408-437-0100 • +1-408-437-0509
sales@dataphysics.com

## G.R.A.S.

***Australia:*** ACU-VIB Electronics
02 9680 8133 • 02 9680 8233
info@acu-vib.com.au

***Australia:*** ETMC Technologies (Aust) Pty Ltd
02 9555 1225 • 02 9810 4022
info@etmc.com.au

***Austria:*** LB-acoustics Messgeräte GmbH
+43 1 25 93 444 4400 • +43 1 25 93 444 3400
office@lb-acoustics.at

***Austria:*** Ing. Wolfgang Fellner GmbH
+43 1 282 53 43 • +43 1 280 41 97
fellner@schallmessung.com

***Belgium:*** Akron N.V. - S.A.
+32 16 23 01 03 • +32 16 23 26 96
info@akron.be

***Brazil:*** SIGNALWORKS Com. Imp. Export. Ltda.
+55 11 5501 5310 • +55 11 5505 5682
info@signalworks.com.br

***Canada:*** Novel Dynamics Inc.
+1 519 853 4495 • +1 519 853 3366
metelka@aztec-net.com

***Canada:*** Novel Dynamics Inc.
+1 613 598 0026 • +1 613 598 0019
Stan@noveldynamics.com

***Denmark:*** G.R.A.S. Sound & Vibration
+45 45 66 40 46 • +45 45 66 40 47
gras@gras.dk

***Finland:*** NOVOTEK
019-871 131 • 019-871 1300
info@novotek.com

***Finland:*** MIP Electronics Oy
+358-9-294 1773 • +358-9-294 7084
jouni.lukkari@mipoy.com

***France:*** 01dB - Stell
+33 5 62 18 95 95 • +33 5 61 83 98 31
alain.guillen@01db-stell.com

***France:*** OROS France SAS
+33 1 69 91 43 00 • +33 1 69 91 29 40
orosfrance@oros-signal.com

***Germany:*** Synotech GmbH
+49 2462 99 1910 • +49 2462 99 1979
info@synotech.de

***Germany:*** Bertram Schapal - AVM
+49 (0)6152 56176 • +49 (0)6152 53590
bertram.schapal.AVM@t-online.de

***Germany:*** Schmeisser, Handelsvertretung
+49 8131 8 02 90 • +49 8131 8 02 70
handelsvertretung.schmeisser@t-online.de

***Germany:*** Wölfel Meßsysteme Software GmbH + Co. KG
(+49) 9 31/4 97 08-5 00 • (+49) 9 31/4 97 08-5 90
deckert@woelfel.de or wms@woelfel.de

***Germany:*** ZINS Ziegler-Instruments GmbH
+49 2166 955 58 • +49 2166 955 800
zins@ziegler-instruments.de

***Greece:*** Paragon LTD
+30-210-2220008 • +30-210-2220019
paragon1@otenet.gr

***Hong Kong:*** S & V Samford Instruments Ltd
+85 228 339 987 • +85 228 339 913
sales@svsamford.com

***Hungary:*** MEGA KFT
+36 (06) 62 438 214/237 • +36 (06) 62 438 214/237
mega@tvnetwork.hu

***India:*** Adams Technologies Pvt. Limited,
+91 44 28173711, 28171631, 52068668 • +91 44 28172676
ganeshhv@adams-tech.net

***India:*** AIMIL Limited
+91 22 2261 5654/55 • +91 22 2261 7524

***India:*** Structural Solutions Private Limited
+91-40-2763 6433 • +91-40-2763 6435
magaffar@stsols.com

***India:*** B. A. Dadachanji & Company
+91 22-6518768 • +91 22-6415747
dadachanji@vsnl.com

***Iran:*** Khadem Sound & Vibration Technology Ltd.,
+98 (0) 2120 279 95/88

***Mobile:*** 091 2148 1578 • +98 (0) 2120 27982
KHADEM@modares.ac.ir

***Italy:*** S.C.S. Controlli e Sistemi S.R.L.
+39 (0) 49 9200 975 • +39 (0) 49 9201 239
g.m.amadasi@scs-controlsys.com

***Italy:*** Audiomatica srl,
+39 (0) 55 65 99 036 • +39 (0) 55 65 03 772
info@audiomatica.com

***Japan:*** Marubun Corporation
+81 3 3639 9881 • +81 3 5644 7627
tsaito@marubun.co.jp

***Japan:*** Riko Associates
+81 4 5935 6995 • +81 4 5935 6993
yas-riko@mars.dti.ne.jp

***Korea:*** SV Corporation
+82 31 501 4030 • +82 31 501 4032
jyjoo@svdigital.com

***Korea:*** Fam Tech Co., Ltd.
+82 55 265 3730 • +82 55 265 3732
sales@famtech.co.kr

***Korea:*** SEVIT Tech
+82 2 2617 8740 • +82 2 6091 1310
sevit@sevitkorea.com

***Malaysia:*** INFO-TRAX SDN BHD
+603 4270 6085 • +603 4270 6054
faisal@infotrax.com.my

***Mexico:*** Christensen, S.A.
+52 55 56812379 • +52 55 56556021
christensen@christensen.com.mx

***Norway:*** Norsonic A/S
+47 32 85 89 00 • +47 32 85 22 08
sbohn@norsonic.com

***P. R. China:*** Landtop Technologies CO., Ltd
+86 10 6802 5665 • +86 10 6801 8063
landtp@public.bta.net.cn

***P. R. China:*** S & V Samford Instruments Ltd
+85 228 339 987 • +85 228 339 913
sales@svsamford.com

***Portugal:*** MRA Instrumentacão, S.A.
+351 21 421 7472 • +351 21 421 8188
mra@taguspark.pt

***Russia:*** OCTAVA + Company
+7 (095) 799 90 92 • +7 (095) 799 90 93
info@octava.ru

***Singapore:*** Sound & Vibration Control Pte Ltd
+65 6742 0722 • +65 6742 6009
wupsj@singnet.com.sg

***Singapore:*** SHAMA Technologies (S) Pte Ltd
+65 776 4006 • +65 773 5056 • +65 776 0592
shama@singnet.com.sg

***Spain:*** ALAVA Ingenieros S. A.
+34 91 567 97 00 • +34 91 570 26 61
alava@alava-ing.es

***Sweden:*** Acoutronic AB
+46 8 765 02 80 • +46 8 731 02 80
acoutronic@acoutronic.se

***Switzerland:*** Norsonic Brechbühl AG
+034 431 31 21 • +034 431 31 22
Matthias.Brechbuehl@norsonic.ch

***Taiwan ROC:*** IEA Electro Acoustics Co. Ltd.
+886 2 2795 5908 • +886 2 2794 0815
iea888@ms71.hinet.net

***Taiwan ROC:*** Purtek Enterprise Co., Ltd.
+886 2 2756 7581 • +886 2 2756 7582
purtek@ms13.hinet.net

***Taiwan ROC:*** Samwell Testing Inc.
+886 2 2692 1400 • +886 2 2692 1380
samwells@ms48.hinet.net

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# International Representatives continued from page 100

***Taiwan ROC:*** Systems Access Company Ltd.
+886 2 8792 6266 • +886 2 8792 6265
sac.tw@msa.hinet.net

***The Netherlands:*** AcouTronics B.V.
+31 (0)162 42 44 21 • +31 (0)162 42 56 52
mailbox@acoutronics.nl

***Turkey:*** DTA Design Test Analysis Ltd Sti
+90 224 225 37 41 • +90 224 225 37 42
akif.goksu@dta.com.tr

***United Kingdom:*** AcSoft Ltd.
+44 (0)1296 682 686 • +44 (0)1296 682 860
sales@acsoft.co.uk

***United Kingdom:*** Campbell Associates
+44 (0)1279 718 898 • +44 (0)1279 718 963
info@campbell-associates.co.uk

***USA:*** G.R.A.S. Sound & Vibration
440 779 0100 • 440 779 4148
sales@gras.us

## Norsonic

***Australia:*** ETMC Technologies PTY Ltd.
+61 295551225
wiepko@maxi.net.au

***Austria:*** Ing. Wolfgang Fellner Ges.M.B.H.
+43 12825343
fellner@schallmessung.com

***Belgium:*** Akron
+32 16230103
info@akron.be

***China (P.R.):*** LandTop Technologies Co., Ltd.
+86 1068025665
info@landtop.com

***Czech Republic:*** Ekola Norsonic s.r.o.
ekola@terminal.cz

***Finland:*** MIP Electronics OY
+358 9294 2193
jouni.lukkari@mip.fi

***Germany:*** Norsonic-Tippkemper GmbH.
+49 252993010
tippkemper@norsonic.de

***Greece:*** Ergoakoustiki Ltd.
+30 2 10 6980601
info@ergoakoustiki.gr

***Singapore:*** Shamatech
+65 6776 4006
shamasvc@singnet.com.sg

***South Korea:*** SV Korea Inc.
+82 31 5014030
jyjoo@svdigital.com

***Spain:*** Aries
+34 915702737
lrodriguez@aries-ingenieria.com

***Switzerland:*** Norsonic Brechbühl AG
+41 344313121
Matthias.Brechbuehl@norsonic.ch

***Poland:*** Energocontrol
+48 12 4180752
arybka@energocontrol.com.pl



***United Kingdom:*** Campbell Associates
+44 1371871030
ian@campbell-associates.co.uk

***USA/Canada:*** Scantek, Inc
+1 (410) 290-7726
PeppinR@scantekinc.com

## PCB Pieoztronics International Distributors

***Australia:*** Davidson Measurement Pty. Ltd.
+61 3 9580 4366 • +61 3 9580 6499
info@davidson.com.au

***Austria:*** nbn Elektronik Handelsges.m.b.H. & Co.
+43-316-402805 • +43-316-402506
nbn@nbn.at

***Belgium & Luxembourg:*** Tech5 bvba-sprl
(+32) 26573164 • (+32) 26574925
info@tech5.be

***Brazil:*** SIGNALWORKS Comércio,Importação & Exportação Ltda.
(+55-11) 5501 5310 • (+55-11) 5505 5682
pprado@signalworks.com.br

***Bulgaria:*** Paragon LTD
(+30) 210 2220008 • (+30) 210 2220019
paragon1@otenet.gr

***Canada:*** Dalimar Instruments, Inc.
+001 450-424-0033 • +001 450-424-0030
daniel@dalimar.ca

***Chile:*** Celestron Ltda.
(+56) 2 264 0404 • (+56) 2 264 1434
ramos@celestron.cl

***China:*** PCB Piezotronics Inc., Beijing Representative Office
(+86) 010 84477840 • (+86) 010 84477913
pcbchina@pcb.com

***Czech Republic:*** nbn ELEKTRONIK
(+42) 385 724308 • (+42) 385 724191
nbn@nbn.cz

***Denmark:*** B&L Technic
+45 44 48 46 60 • +45 49 70 75 90
info@bl-technic.dk

***Egypt:*** Scientific Services Co.
(+202) 4027345 • (+202) 4010874
ssco@commnet.com.eg

***Finland:*** Novotek Finland Oy
(+358) 19 8711372 • (+358) 19 8711300
juhani.yrjana@dosesoft.fi

***France:*** PCB Piezotronics S.A.
+33 (0) 1 69 33 19 60 • +33 (0) 1 69 33 19 76
pcbfrance@pcb.com

***Germany:*** PCB Europe GmbH
+49 2462 99190 • +49 2462 99179
info@synotech.de

***Great Britain*** (UK): Techni Measure
(+44) 1527 854103 • (+44) 1527 853267
sales@techni-measure.co.uk

***Greece:*** Paragon LTD
(+30) 210 2220008 • (+30) 210 2220019
paragon1@otenet.gr

***Hungary:*** Professzionális Ipari Méréstechnika Bt.
(+36) 1 424 0099 • (+36) 1 424 0097
pim-bt@axelero.hu

***India:*** Structural Solutions Private Limited
+91 40 2763 6433 • +91 40 2763 6435
info@stsols.com

***Indonesia:*** PT Klaras Pusaka Instrumindo
+62 (21) 7694487 • +62 (21) 758182
bsugiharta@klaras.co.id

***Ireland:*** Environmental Measurements
+353 (0) 1 4149445 • +353 (0) 1 4057917
daraghobrien@e-m.ie

***Israel:*** Arrow Rapac Ltd.
(+972) 3 9203486 • (+972) 3 9203443
arrow@arrow-israel.co.il

***Italy:*** Luchsinger S.R.L.
(+39) 035462678 • (+39) 035462790
info@luchsinger.it

***Italy:*** PCB Piezotronics Italy
+39 333 7687247
info@pcbpiezotronics.it

***Japan:*** Toyo Corporation - Team PCB
(+81) 332451240 • (+81) 352052030
pcb@toyo.co.jp

***Malaysia:*** Benima Engineering Sdn Bhd
+60 (3) 5632 7441 • +60 (3) 5632 7401
benimarail@yahoo.com

***Mexico:*** Comercial Anfra, S.A. de C.V.
(+52) 55 55642571 • (+52) 55 55648718
anfra@attglobal.net

***Netherlands:*** Tech 5 B.V.
(+31) 184615551 • (+31) 184615451
info@tech5.nl

***New Zealand:*** Machinery Monitoring
(+64) 96233147 • (+64) 96233248
mamos@clear.net.nz

***Norway:*** RH Semitronic AS
+47 22803780 • +47 22803825
nordby@rh-semitronic.no

***Pakistan:*** Affiliates International
(+92) 21 2852151 • (+92) 21 5870384
affiliat@cyber.net.pk

***Philippines:*** Menvirotek Enterprises Corp.
(+63) 2 9300538 • (+63) 2 9300538
menvirotek@hotmail.com

***Poland:*** Energocontrol Sp. Z.O.O.
(+48) 124180752 • (+48) 124114517
cad@energocontrol.com.pl

***Portugal:*** MRA Instrumentacao
(+35) 1214217472 • (+35) 1214218188
mra@taguspark.pt

***Puerto Rico:*** VibrAnalysis, Inc.
+001 (787) 283-7500 • +001 (787) 283-7680
FLaboy@vibranalysispr.com

***Romania:*** ROMEGA
(+40) 21 2225729 • (+40) 21 2225730
dragos_muntean@mail.dntcj.ro

***Russian Federation:*** Octava+ Company
+7 095-799-90-92 • +7 095 -799-90-93
info@octava.ru

***Saudi Arabia:*** 3E-Engineering Equipment EST
(+966) 3 38985246 • (+966) 3 38985246
ksd3e@sahara.com.sa

***Singapore:*** Spectra Instruments Pte Ltd
(+65) 67478857 • (+65) 67475873
spectrainst@pacific.net.sg

***South Africa:*** Andersen & Hurley Instruments
(+27) 11 679 3815 • (+27) 11 675 0694
mail@andersen-hurley.co.za

***South Korea:*** KTM Engineering, Inc.
+82 2-3413-2002 • +82 2-3413-2222
sales2@ktme.com

***Spain:*** Alava Ingenieros SA
(+34) 91 5679700 • (+34) 91 5702261
g.gonzalez@alava-ing.es

***Sweden:*** PCB Europe
(+46) 8 4443870 • (+46) 8 4443875
info@pcbscandinavia.se

***Switzerland:*** Ing. Bureau Dollenmeier GmbH
+41 18854511 • +41 18854512
sales@ibdoll.ch

***Taiwan:*** Prowave Engineering Inc.
(+886) 3 521 0504 • (+886) 3 521 0571
info@prowavegroup.com

***Thailand:*** Intro Enterprise Company Limited
+66 (2) 946-1732 • +66 (2) 946-1738
intro@ksc.th.com

***Turkey:*** E3TAM A.S.
+90 (212) 275 22 80 • +90 (212) 273 23 19
salih@e3tam.com

## Regupol QT Sound Insulation Products

***US and Canada:*** Paul Downey
416 440 1094
pcd@regupol.com

## Rion Co., Ltd.

***Australia:*** Acoustic Research Laboratories Pty Ltd
+61 2 9484 0800 • +61 2 9484 0884
sales@acousticresearch.com.au

***Austria/Hungary/Yugo/Slovenia/***

***Czech/Croatia:*** LB-acoustics Messgeraete GmbH
+43 1 259 34 44 4400 • +43 1 259 34 44 3400
Office@LB-acoustics.at

***Canada, Mexico, USA:*** Scantek Inc.
+1 410 290 7726 • +1 410 290 9167
info@scantekinc.com

***Finland:*** MIP Electronics Oy
+358 9 2941773 • +358 9 2947084
jouni.lukkari@mipoy.com

***Germany:*** ZINS Ziegler-Instruments GmbH
+49/(0)2166/955-58 • +49/(0)2166/955-800
sales@ziegler-instruments.de

***Hong Kong:*** Science International Corporation
+852 2 543 7442 • +852 2 541 4089
tonyleung@scienceintal.com

***India:*** Mecord Systems and Services Pvt. Ltd.
+91-22-5008604, +91-22-5008128 • +91-22-5007560
mecord.systems@vsnl.com

***Indonesia:*** PT Transindotama Sinar Perkasa
+62 21 4584 0670 • +62 21 4584 2942
transit@dnet.net.id

***Ireland:*** Industrial Acoustics Limited
+353-1-2828034 • +353-1-2828427
industrial@eircom.net

***Italy:*** S.C.S. Controlli e Sistemi S.r.l.
+39-049-920 09 75 • +39-049-920 12 39
gaita@scs-controlsys.com

***Korea:*** Sunil Measuring System Co., Ltd.
+82 2 572 8481 • +82 2 572 7931
sunilms@sunilms.co.kr

***Malaysia:*** O'Connor's Engineering Sdn. Bhd
+60 3 7953 8400 • +60 3 7957 7871
mawardis@oce.com.my

***Netherlands, Belgium, Luxembourg:*** Goffin Meyvis Analytical & Medical Systems B.V.
+31-76-508 60 00 • +31-76-508 60 86
bstuart@goffinmeyvis.com

***New Zealand:*** Machinery Monitoring Systems Ltd
+64 9 623 3147 • +64 9 623 3248
mms@bitz.co.nz

***Portugal:*** M.R.A. Instrumentacao S.A.
+351-21-421 74 72 • +351-21-421 81 88
n.dias@mra.pt

***Republic of South Africa:*** Environmental Instruments International cc
+27 21 910 3403 • +27 21 919 7783
env.inst@iafrica.com

***R.O.C, Taiwan:*** Ring-In Trading Development Co., Ltd.
+886 2 2381 6767 • +886 2 2381 2423
ringin@ms6.hinet.net

***Singapore:*** O'Connor's Singapore Pte Ltd
+65 6473 7944 • +65 6472 4508
tan.wheelee@oconnor.com.sg

***Spain:*** ALAVA Ingenieros S.A.
+34-91-567 97 00 • +34-91-570 26 61
j.ruiz@alava-ing.es

***Sweden:*** Acoutronic AB
+46 8 765 02 80 • +46 8 731 02 80
acoutronic@acoutronic.se

***Switzerland:*** A -TECH&Consulting GmbH
+056 634 26 26 • +0566 345 345
a-tech@swissonline.ch

***Thailand:*** Sithiporn Associates Co., Ltd.
+66 2 433 8331 • +66 2 433 1679
purchase@sithporn.co.th

***United Kingdom:*** ANV Measurement Systems
+44-1908-64 28 46 • +44-1908-64 28 14
info@noise-and-vibration.co.uk

## Scantek, Inc.

***Mexico and South America:*** Ik' Atl, S.A. de C.V.
52 5547 4678 • 52 5547 4678
ikatl@hotmail.com

## SoundPLAN LLC

***Argentina:*** Dakar ingenieria acustica Argentina
+54 11 4865 79 84
Soundplan@dakar-acustica.com.ar

***Australia:*** Marshall Day Acoustics
+61 39416 1855 • +61 39416 1231
noelmorris@marshallday.com.au

***Brazil:*** GROM Acustica & Automacao
+55 21 263 0792 • +55 21 263 9108
comercial@grom.com.br

***Canada:*** Navcon Engineering Network
+1 714 441 3488 • +1 714 441 3487
Forschner@navcon.com

***China:*** BSWA Technology Co., Ltd
+86 10 6200 6160 • +86 10 6200 6201
chenfeng@bswa.com.cn

***Czech Republic:*** SYMOS s.r.o.
+42 2 57 22 56 77 (78) • +42 2 57 22 56 76 (79)
symos@symos.cz

***Dennmark:*** SoundPLAN Nord ApS
+45 39 46 12 00 • +45 39 46 12 02
JKL@soundplan.dk

***Finland:*** SoundPLAN Nord ApS
+45 39 46 12 00 • +45 39 46 12 02
JKL@soundplan.dk

***France:*** Euphonia
+33 02 40 18 05 18 • +33 02 40 19 05 20
bsuner@euphonia.fr

***Germany:*** Braunstein + Berndt GmbH
+49 7191 91 44 0 • +49 7191 91 44 24
bbgmbh@soundplan.de

***Greece:*** Industrial Acoustics Hellas
+3010 6630 333 • +3010 6630 334
dpramas@hotmail.com

***Hungary:*** VIBROCOMP GmbH
+36 1 275 2138 • +36 1 275 2138
Vibrocomp@matavnet.hu

***India:*** Foretek Marketing Pvt. Ltd.
+91 80 526 6813 • +91 80 526 6813
info@foretekin.com

***Italy:*** Spectra s.r.l.
+39 039 613321 • +39 039 6133235
spectra@spectra.it

***Indoneisa:*** SHAMA Technologies (S) Pte Ltd
+65 6776 4006 • +65 6776 0592
shama@singnet.com.sg

***Japan:*** Consutling Group Technical Center
+81 45 935 3818 • +81 45 935 3806
Watanan@onosokki.co.jp

***Korea (South):*** ABC TRADING
+82 2 2226 3151 • +82 2 2226 7383
kslee@abctrd.com

***Malaysia:*** SHAMA Technologies (S) Pte Ltd
+65 6776 4006 • +65 6776 0592
shama@singnet.com.sg

***New Zealand:*** Marshall Day Associates
+64 9 379 7822 • +64 9 309 35 40
keith@Marshallday.co.nz

***Norway:*** SoundPLAN Nord ApS
+45 39 46 12 00 • +45 39 46 12 02
JKL@soundplan.dk

***Poland:*** PC++ Software Studio S.C.
+48 602 228317 • +48 58 677 1847
koniarek@interecho.com

***Portugal:*** AAC Centro de Acustica Aplicada SL
+349 45 298233 • +349 45 298261
alberto@aac.pt-alava.es

***Singapore:*** SHAMA Technologies (S) Pte Ltd
+65 6776 4006 • +65 6776 0592
shama@singnet.com.sg

***Spain:*** AAC Centro de Acustica Aplicada SL
+349 45 298233 • +349 45 298261
alberto@aac.pt-alava.es

***Sweden:*** Sveriges Provnings-och Forskningsinstitut
+46 33 16 53 40 • +46 33 165 420
Andreas.Gustafson@sp.se

***Taiwan:*** Purtek Engerprise Co Ltd
+886 2 2769 3863 • +886 2 2756 7582
purtek@ms13.hinet.net

***United Kingdom:*** Technical Development & Investigation
+44 1206 762617 • +44 1206 762617
tdi.ltd@ntlworld.com

***USA:*** Navcon Engineering Network
+1 714 441 3488 • +1 714 441 3487
Forschner@navcon.com

## illbruck

### *illbruck introduces SONEXtrilayer™System*

illbruck has expanded its line of acoustic test environment options to include the SONEXtrilayer System. An alternative to its traditional SONEXunilayer™System, SONEXtrilayer is said to require 28 to 48 percent less space, which may allow existing spaces to be retrofitted as anechoic chambers without the need for new construction.

SONEXtrilayer is a combination of resonator, barrier and absorptive material layering. Three absorption layer options — SONEXflat™ Panels, SONEXmax™ Wedges and SONEXpyramid™ Panels — are offered to meet cut-off frequency requirements. All three are constructed with illbruck's Class 1 fire-rated willtec® material.

Also available from illbruck is its traditional solution for acoustic test chambers, SONEXunilayer System, offered with SONEXsuper™ and SONEXmax Wedges. The lightweight wedges, constructed from willtec, install seamlessly for a continuous panel appearance.

SONEXtrilayer and SONEXunilayer Systems can be tailored to meet unique requirements for room and test specimen size, cut-off frequency and precision test methods. These solutions also provide exceptional performance — from desired cut-off frequency through the highest frequency.

From facility design to final certification, illbruck provides complete acoustic test chamber solutions — full anechoic and hemi-anechoic environments — for the most precise testing and benchmarking in aerospace, automotive, electronics, research, government and hard goods manufacturing. illbruck systems for acoustic test chambers are used by Sony, NASA, Airbus Industries and Continental Tire in research voice recording systems, space and aircraft component testing, commercial aircraft component testing and tire research, respectively. illbruck's acoustic test environments are said to meet ISO 3744 engineering methods and ISO 3745 precision methods.

*For information about SONEXtrilayer and SONEXunilayer Systems, visit the illbruck Web site, www.illbruck-sonex.com/anechoic, or call 800-662-0032.*

## Navcon

### *Navcon Releases INSUL V6.0*

Navcon's INSUL 6.0 has been released with the following features:

- The prediction of airborne sound insulation performance of walls, floors, ceilings and windows
- The prediction of impact sound insulation of concrete floors with different floor coverings *(new in Version 6.0)*
- Accurate estimates of Transmission Loss (TL), Weighted Sound Reduction Index (Rw or STC), Sound level Difference (DnTw) including C and Ctr corrections and impact sound pressure level (Ln,w or IIC)

*More information can be found on the Navcon web site at http://www.navcon.com/Insul.htm or download the INSUL 6 brochure at http://www.navcon.com/download/insulversion6.pdf. To download a trial version of INSUL V6.0 please visit http://www.navcon.com/InsulSoftware.htm .*

## Larson Davis

### *SoundTrack LxT™ Sound Level and Octave Band Meter*

The new Soundtrack LxT™ sound level meter from Larson Davis is said to offer an innovative approach to sound measurement for compliance and exposure monitoring. Available in Type 1 or Type 2 versions, the SoundTrack™ provides an easy way to manage route- or task-based workplace noise surveys. With operator route prompts and digital voice annotation, surveys are done quickly and easily by operators at all skill levels. Optional integrated real-time 1/1 and 1/3. Octave filter performs frequency band analysis instantly with no tedious 'step-through' required.

*For more information, contact Larson Davis at www.LarsonDavis.com or 888-258-3131.*

## LMS

### *LMS Expands Development Centers and Commercial Operations in Europe and Asia*

LMS has announced the creation of a new Eastern European engineering and software development center in Romania, the opening of a new commercial subsidiary in Singapore and additional offices for its sales activities in China. The opening of the new offices complements a considerable expansion of LMS' headquarters office and development center in Leuven, Belgium, and the recent opening of new offices in Munich, Lyon and Moscow. The extensions are part of the continued international expansion strategy of LMS and will further strengthen the company's capabilities to deliver top-class engineering software and services. Over the next 2 to 3 years, LMS expects to expand its total number of employees to over 800.

To support the expansion of its software and systems development activities in the area of virtual prototype simulation and physical testing, LMS initiated a considerable extension of its headquarters facilities in Leuven, Belgium. The new office provides an

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additional 3300 square meters and will allow LMS to expand its Leuven-based staff from 350 to 400 employees over the next 2 to 3 years.

Next to the extension of the headquarter facilities, LMS recently created a new engineering and software development center in Brazov, Romania. By the end of 2007, LMS plans to recruit a team of over 50 engineers in its Eastern European competence center. "We created the new subsidiary in Romania to take optimal advantage of the extensive availability of top-quality engineers in Eastern Europe at very affordable conditions", commented Urbain Vandeurzen, Chairman and CEO of LMS. "With a current yearly R&D budget of 25 million Euro, LMS is strongly committed to developing innovative technologies. The new team will further support the steady growth of our R&D capacity in our five other development locations in Europe and the US. It will play a key role in accelerating our software development activities and in expanding our engineering services capabilities."

Building on the company's already impressive growth in South-East Asia, LMS decided to extend its current network of fully owned operations and representative offices in Asia with a new subsidiary in Singapore. The new Singapore office will become a regional hub to support LMS' indirect sales channels in the South-East Asia region. In China, in addition to its Beijing office, LMS is also adding two new offices in Shangai and Guanzhou. The new offices are intended to increase the regional coverage of LMS in the booming Chinese market for engineering software and services. Overall, the growth in the Asian market, and the strong presence of LMS in Europe and the US, deliver a well-balanced revenue spread for the company: 42% in Europe, 36% in Asia and 22% in North America. With the addition of new sales offices, LMS now operates from 18 direct sales offices and 25 representative offices worldwide.

### *Ricardo Selects LMS Test.Lab for Global Powertrain and Vehicle NVH Development*

LMS has announced that leading automotive technology and engineering services provider, Ricardo plc, has selected LMS Test.Lab as its new standard environment for noise and vibration testing and engineering. The company intends to deploy over 20 LMS Test.Lab systems for powertrain and full-vehicle NVH engineering at its technical centers throughout Europe and the USA.

As part of Ricardo's wide-range advanced engineering activities, the company provides high-level NVH engineering services drawing upon its extensive experience in developing and refining complete vehicles and individual vehicle subsystems. With the world's automakers demanding ever-shorter development timescales, Ricardo recognizes the need to increase the efficiency of its NVH testing operations. The company's engineers must have confidence in the validity and accuracy of testing, whether executing powertrain measurements, transfer path analysis or full vehicle tests. To improve the effectiveness and efficiency of its NVH operations, Ricardo has decided to standardize its worldwide NVH testing systems on the LMS Test.Lab software suite and LMS SCADAS III data acquisition front-ends.

### *LMS introduces Revision 5 of LMS Virtual.Lab*

LMS has announced the introduction of LMS Virtual. Lab Rev 5. The new release of LMS Virtual.Lab offers new and completed applications for structural analysis, vehicle ride & handling, interior acoustics simulation, road noise and durability analysis. With Rev 5, LMS Virtual.Lab gets new capabilities to automate repetitive simulation tasks and to capture complex simulation processes into easy-to-use application templates.

The new Auto-Recursive Solver in LMS Virtual.Lab Motion records up to 60% time savings in solving complex simulation models with long series of linked components and high number of contact points between components. This eliminates the calculation bottleneck for the simulation of the dynamic behavior of timing chains, belts, tracked vehicles, complex production machines, etc. To guarantee realistic simulations with high fidelity, Rev 5 also introduces a new LMS Virtual.Lab Correlation module that enables users to validate virtual models with test results, or alternatively, with validated models of similar designs.

### *NPO Saturn selects LMS Test.Lab for dynamic testing of jet engines*

LMS and NPO Saturn have announced the signing of a contract for a 250-channel jet engine testing solution at MAKS 2005, the International Aviation & Space Salon in Moscow, Russia. The LMS dynamic testing solution will be deployed on Test Bench 26, located at NPO Saturn's test center near Rybinsk, and dedicated for certification and production testing of the new gas-turbine engine SaM146.

NPO Saturn is a leading Russian company in the field of development and production of gas turbine engines for aviation, navy, energy production and gas compression stations. The renovation of the NPO Saturn Test Bench 26 is realized within the framework of program SaM146, a joint development of NPO Saturn and the French engine manufacturer Snecma. The SaM146 will power all versions of the Russian Regional Jet (RRJ), created by ZAO "Sukhoy Civil Aircraft". The RRJ is a 60, 75 and 98 seats jet plane, for basic and

long-range flights, and provides commonality that will give operators substantial savings.

## PCB Piezotronics

### *Pressure Sensors and Signal Conditioners*

The Pressure Division of PCB Piezotronics, Inc. offers pressure sensors and signal conditioners that support the TEDS (Transducer Electronic Data Sheet) IEEE P1451.4 standard. TEDS sensors are self-identifying transducers that contain fields that fully describe the type, operation, and attributes of the transducer, and are typically used in large channel count testing such as acoustic array applications. The IEEE P1451.4 standard defines a mixed-mode interface that retains the traditional analog sensor signal, but adds a low-cost serial digital link to access a TEDS embedded in the sensor for self-identification and self-description. The embedded memory chip eliminates the need to manually input sensor parameters when configuring a system. Users will be able to simplify sensor set-up, use, and maintenance, obtain calibration data, and eliminate manual data entry and error when using TEDS pressure sensors.

### *PCB Piezotronics Opens New Subsidiary in Italy*

PCB Piezotronics, Inc. (PCB®), and Luchsinger srl have announced the formation of a long-term sales agreement, aimed at furthering mutual business development objectives within the Italian sensor market. Under the terms of this agreement, PCB® will increase its sales presence in Italy through the establishment of a wholly-owned subsidiary. PCB Piezotronics srl will focus efforts on the automotive, aerospace, defense and OEM markets. Luchsinger, a PCB® distributor for more than 30 years, will continue to support most of its traditional customer base.

Notes Kevin J. Cornacchio, PCB® Vice President of Sales, "This newly defined structure builds on the excellent work of the Luchsinger organization over the years, while providing the necessary infrastructure to effectively promote and service the new and emerging markets, customers and technologies of PCB®. The two organizations will be working closely together to ensure the highest level of support to our combined customer base, continuing a long-standing trend of growth in Italy."

Joining the PCB Piezotronics team in Italy are Paolo Sermisoni and Carmine Salzano. Messers Sermisoni and Salzano bring a combined industry experience of more than 40 years, with strong emphasis in sensing technology for vibration, acoustics, pressure, force, torque, and strain measurements. Dr. Ing. Salzano will also hold the position of International Aerospace and Defense Manager at PCB Piezotronics, Inc.

### *PCB Offers New Model 377B41 Externally Polarized Free Field ½" Microphone*

The Vibration Division of PCB Piezotronics, Inc. (PCB®), introduces new Model 377B41 externally polarized, 1/2" Free Field type microphone. The distinguishing feature of this model is its enhanced sensitivity rating of 50 mV/Pa. It has wide dynamic range (15 to 146 dB (A) re 20μPa) and a frequency range from 3.15 Hz to 20,000 Hz (+/- 2 dB). This traditional type condenser microphone has a +150 °C (+302 °F) operating temperature range, and –when combined with the PCB® Model 426A30 preamplifier –operates from a 200 V power supply for externally polarized microphones. This traditional-style microphone preamplifier terminates in a 7-pin LEMO style connector.

In addition to its traditional 200V models, PCB® carries a full line of modern, pre-polarized, condenser microphones and preamplifiers. Powered by a 2 to 20 mA signal conditioner and standard coaxial cables, these modern designs allow for significant savings in power supply and cabling cost, greater ease-of-use and operate from the same power as is required for ICP® accelerometers. This provides the advantage of using microphones with ICP® accelerometers in the same test, with the same signal conditioning equipment, minimizing set-up time.

### *New Triaxial Ceramic Shear ICP® Accelerometer Family Measures Vibration in Three Orthogonal Directions*

The Vibration Division of PCB Piezotronics, Inc. (PCB®), introduces Series 354B, a new family of Triaxial ICP® Ceramic Shear accelerometers, which simultaneously measure vibration in three orthogonal directions. Model 354B20 has a sensitivity of 2.5 mV/g (0.255 mV/(m/s$^2$)) with a 2000 g (19620 m/s$^2$) measurement range; Model 354B21 has a sensitivity of 10 mV/g (1.02 mV/(m/s$^2$)) with a 500 g (4905 m/s$^2$) measurement range; and Model 354B22 has a 100 mV/g (10.2 mV/(m/s$^2$)) sensitivity with a 50 g (491 m/s$^2$) measurement range. Each sensor has three separate, hermetically sealed, titanium cased, single axis sensors permanently mounted onto a single, hard anodized mounting block. In addition, each sensor features three individual 10-32 coaxial connectors.

These sensors are ideally suited to legacy applications, where both the footprint of the sensor and mounting hole locations are fixed. This sensor family features built-in microelectronic signal conditioning circuitry, which offers a low-noise, low impedance output signal while permitting long distance signal transmission and simplicity of operation. These durable designs are bolt mounted,

*continued on page 107*

## European News *continued from page 98*

on laboratory tests of various methods. The report also presents findings from case studies involving low frequency noise sufferers in their homes. The report concludes with a proposed criteria and procedure for assessing low frequency noise.

**Procedure for the assessment of low frequency noise complaints.** This report takes the proposed criteria from the University of Salford's initial report and develops it into a methodology through which local authorities can assess low frequency noise complaints.

**Field trials of proposed procedure for the assessment of low frequency noise complaints.** This report on the field trials presents findings on the use of the methodology by local authorities. Salford University contacted sixty two local authorities to take part in the testing of the methodology, of which five local authorities took part using 'live' cases involving complaints of low frequency noise. One of these local authorities investigated two cases.

operate in –65 to +250 °F (-54 to +121 ºC) temperatures, and survive accidental shock inputs to 5000 g (49050 m/s²).

### *ATEX / CSA Intrinsically Safe Vibration Transmitters*

The IMI Sensors Division of PCB Piezotronics, Inc. introduces a new line of 4 to 20 mA vibration transmitters with intrinsic certifications for monitoring of critical machines. These intrinsically safe sensors comply to ATEX and CSA North American standards and are used to monitor critical rotating machinery in refineries, grain processing facilities, or mines where hazardous gas or dust may be present, thus requiring this safety certification.

The 4 to 20 mA transmitters are loop powered and can be conveniently interfaced with existing plant monitoring equipment such as PLC, DCS, or SCADA systems. Standard features include hermetic sealing, frequency response from 180 to 600,000 cpm (3 to 10 kHz), stainless steel construction, ¼-28 or M6 mounting hardware, temperature –40 to +185 °F (-40 to +85 °C). Standard sensors provide the choice of acceleration or velocity output signals and in either RMS or peak versions. Optional temperature or analog output is available. The analog vibration option gives a technician the ability to perform detailed signal analysis.

### *Maintenance Free, Flange Mount Torque Transducers*

Series 4149 Flange Mount Rotating torque transducers from the Force/Torque Division of PCB Piezotronics, Inc. utilize non-contact, rotary transformers for sending excitation voltage to, and receiving measurement signals from, the rotating strain gage sensor. The maintenance-free, rotary transformer design eliminates the need for replacing worn brushes, as is the case with conventional slip ring type rotating torque sensors.

The flange mount units are shorter than shaft mount styles and are an ideal choice for use in dynamometers and in torque studies on fuel pumps, hydraulic motors and pumps, combustion engines, drive shafts, transmissions, fans, and electric motors where axial space is limited.

The Series 4149 rotary transformer torque sensors offer capacities from 5,000 in-lb to 30,000 in-lb (565 to 3390 N-m) full scale and maximum speeds to 8,000 rpm. In addition to the torque output signal, an optional pickup provides an output proportional to speed. The units feature high signal-to-noise ratio and high torsional stiffness and are available with optional keyed splined shafts. Custom designed units are available for alternate measurement ranges and speeds.

### *Torque Transducers for Aerospace Hydraulic Pumps and Motors*

Rotating torque transducers from the Force/Torque Division of PCB Piezotronics, Inc. (PCB®), utilize non-contact, rotary transformers for sending excitation voltage to, and receiving measurement signals from, the strain gage instrumented rotating sensor element. The rotary transformer design eliminates the need for replacing worn brushes, as is the case with conventional slip ring type rotating torque sensors.

Because of their unique flange and splined shaft design (conforms to AND 10262 & 20002), the units are an ideal choice for use in torque studies on cantilevered aerospace hydraulic motors and pumps. Other applications include dynamometers for combustion engines, drive shafts, transmissions, fans, and electric motors.

In addition to the torque output signal, an optional pickup provides an output proportional to speed and an optional K type thermal couple to monitor internal bearing temperature. The units feature high torsional stiffness and low rotating inertia. Custom designed units are available for alternate measurement ranges and speeds.

*For further information on PCB products, contact Andrea Mohn, Marketing Coordinator, PCB Piezotronics, Inc., 3425 Walden Avenue, Depew, NY 14043-2495 USA. Telephone: +1 800 828 8840 ext. 2216; Fax: +1 716 684 0987; E-Mail: mktg@pcb.com.*

# Acknowledgements


## INCE/USA Liaison Program

ACO Pacific, Inc. ..... Belmont, California
Brüel and Kjær North America, Inc. ..... Decatur, Georgia
Cavanaugh Tocci Associates ..... Sudbury, Massachusetts
G.R.A.S. Sound and Vibration ..... Vedbaek, Denmark
Colin Gordon and Associates ..... San Bruno, California
Harris Miller Miller and Hanson, Inc. ..... Burlington, Massachusetts
Industrial Acoustics Company ..... Bronx, New York
IBM Corporation ..... Armonk, New York
Iowa State University ..... Ames, Iowa
Larson Davis, Inc. ..... Provo, Utah
Noise Control Engineering, Inc. ..... Billerica, Massachusetts
Overly Door Company ..... Greensburg, Pennsylvania
The Pennsylvania State University ..... State College, Pennsylvania
Purdue University ..... West Lafayette, Indiana
Quest Technologies, Inc. ..... Oconomowoc, Wisconsin
Scantek, Inc. ..... Columbia, Maryland
Vibro-Acoustics ..... Scarborough, Ontario, Canada
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## Sustaining Members of International INCE

Brüel & Kjær ..... Nærum, Denmark
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USA ..... Graduate Program in Acoustics, The Pennsylvania State University, State College, Pennsylvania


# Conference Calendar

*Below is a list of congresses and conferences sponsored by International INCE and INCE/USA. A list of all known conferences related to noise can be found by going to the International INCE page on the Internet, www.i-ince.org.*

### 2006 September 18-21

**ACTIVE 2006**

***The 2006 International Symposium on Active Control of Sound and Vibration***

Adelaide, Australia
Contact: ACTIVE 2006 Conference, School of Mechanical Engineering, The University of Adelaide, SA 5005 Australia
Internet: www.active2006.com

### 2006 December 03-06

**INTER-NOISE 2006**

***The 2006 International Congress and Exposition on Noise Control Engineering***

Honolulu, Hawaii, USA. Contact: Institute of Noise Control Engineering, INCE/USA Business Office, 210 Marston, Iowa State University, Ames, IA 50011-2153. Tel. +1 515 294 6142; Fax: +1 515 294 3528; e-mail: IBO@inceusa.org. Internet: http://www.inceusa.org.

### 2007 August 26-29

**INTER-NOISE 2007**

***The 2007 International Congress and Exposition on Noise Control Engineering***

Istanbul, Turkey.
Contact: Turkish Acoustical Society
Yeni Krizantem Sok. No 78
Ic Levent, 34330 Istanbul, Turkey
Tel: +90 212 279 95 22 • Fax: +90 212 264 65 07
E-mail: contact@internoise2007.org.tr
Internet: www.internoise2007.org.tr

### 2007

***NOISE-CON 07, The 2007 National Conference on Noise Control Engineering***

This conference will be held in the Western United States, probably in the fall. Contact: Institute of Noise Control Engineering, INCE/USA Business Office, 210 Marston, Iowa State University, Ames, IA 50011-2153. Tel. +1 515 294 6142; Fax: +1 515 294 3528; e-mail: IBO@inceusa.org. Internet: http://www.inceusa.org.

# Directory of Noise Control Services

*Information on listings in the Directory of Noise Control Services is available from the INCE/USA Business Office, 210 Marston, Iowa State University, Ames, IA 50011-2153; +1 515 294 6142; Fax: +1 515 294 3528; IBO@inceusa.org. The price is USD 400 for 4 insertions.*



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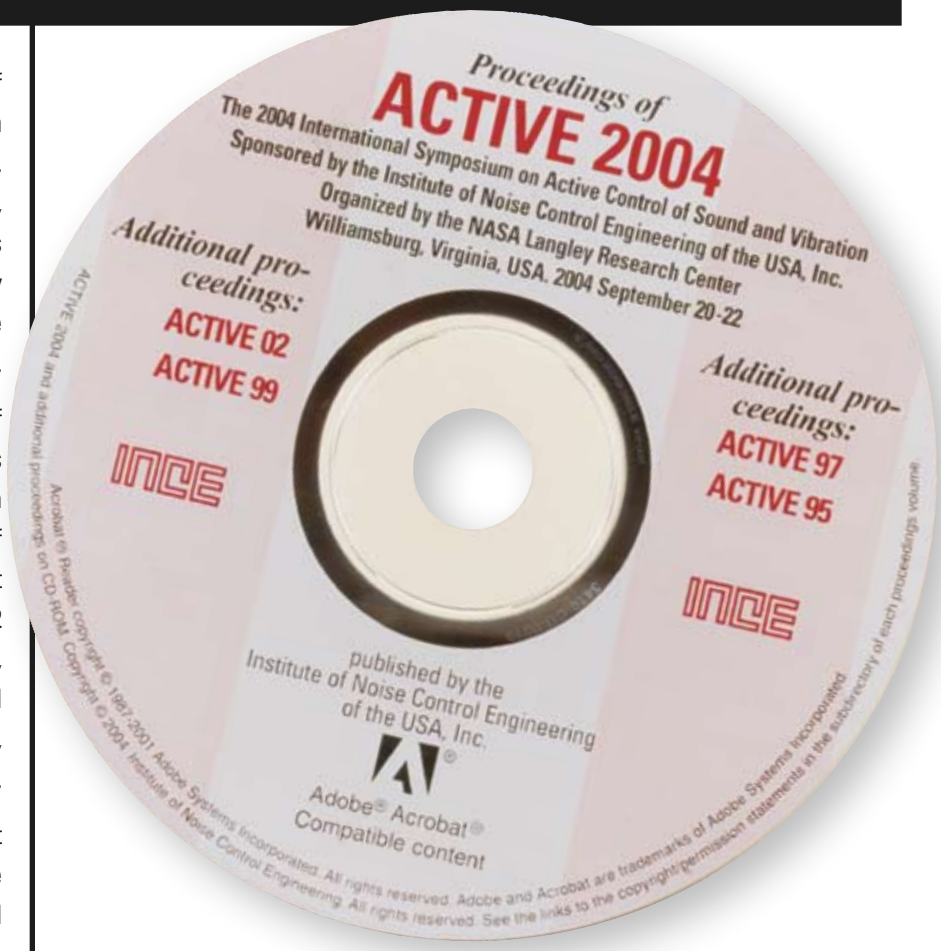
# ACTIVE 04 CD-ROM

## *WITH ADDITIONAL PROCEEDINGS*

This CD-ROM contains the Proceedings of ACTIVE 04, The 2004 International Symposium on Active Control of Sound and Vibration. ACTIVE 04 was held in Williamsburg, Virginia, USA on September 20-22. The Symposium was sponsored by INCE/USA, and was organized by the NASA Langley Research Center. There are 101 papers from ACTIVE 04 on the CD-ROM.

The CD-ROM also contains the proceedings of four other ACTIVE Symposia. ACTIVE 02 was held at the Institute of Sound and Vibration Research in the United Kingdom in July of 2002 (117 papers). ACTIVE 99 was held in Fort Lauderdale, Florida, USA in December, 1992 (115 papers), ACTIVE 97 was held in Budapest, Hungary in August, 1997 (103 papers), and ACTIVE 95 was held in Newport Beach, California in July of 1995 (125 papers).

Together, these 561 papers are the most extensive collection ever published on the technical aspects of active control of sound and vibration. The CD-ROM can be searched by any character string.

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