

**Top Ten Issues
Acoustics in Australia**

Research Report AVU 0301

**for
Australian Acoustical Society**

by

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SUMMARY

A study has been undertaken on behalf of the Australian Acoustical Society (AAS) to identify the 'top ten' issues of concern to the acoustics community and to indicate the directions to be pursued to redress the problems identified. This report has been prepared by the Acoustics and Vibration Unit of the University of New South Wales at the Australian Defence Force Academy with support via an Educational Grant from the AAS.

An open ended survey of key stakeholders in the AAS was undertaken. The response was good and the range of issues were consolidated into main areas. The ten key strategic issues for 2003/4 were identified as:

- 1 Public face for Acoustics
- 2 Educate the youth on acoustics
- 3 Improve the education of those in acoustics
- 4 Retain and expand publicly funded acoustic facilities
- 5 Retain acoustic expertise in publicly funded organisations and agencies
- 6 Retain reputation of profession
- 7 Grow the AAS
- 8 Involve all members
- 9 Professional support
- 10 Encourage research

The suggested actions involved the management of the AAS taking a positive role by establishing structures which can utilise the strengths of the membership to achieve the goals. These were discussed at the Future Directions Workshop held at the end of May. Selected actions were agreed to at that workshop and the Council made the commitment for implementation.

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1.0 INTRODUCTION

This report has been prepared by the Acoustics and Vibration Unit of the University of New South Wales at the Australian Defence Force Academy for the Australian Acoustical Society (AAS) and with support via an Educational Grant.

There is a real concern among the members of the AAS about the lack of support at all levels of government for research and education in acoustics in Australia. This issue has been raised in the President's editorial in the journal (*Acoustics Australia*, **30**(2) p47 2002). While there is general agreement that there is a problem, there has been no clear plan of actions that can be taken by the Society to redress the damage that has already been done and to forge an expanding role for acoustics in Australia in the future.

The aim of this project is to identify the top ten issues of concern to the acoustics community and the directions that could be pursued to redress the problems identified. The responsibilities for actions lie with the AAS Management and the individual members of the AAS. There is also the possibility of actions via the Federation of Australian Scientific and Technological Societies (FASTS) which is a lobby group with strong links into all levels of government.

2.0 BACKGROUND

The areas of interest for the members of the AAS cover all aspects of sound and vibration. Table 2.1 [AAS Directory 2001] shows how extensive this range is. Note that members can indicate an interest in up to five subject areas.

Table 2.2 Areas of interest of members of AAS [AAS Directory 2001]

Area of Interest	Number
Speech communication	61
Physiological and psychological acoustics	91
Noise: its effects and control	319
Shock and vibration	211
Architectural and building acoustics	264
Bioacoustics	17
Ultrasonics, quantum acoustics and physical effects of sound	16
Underwater acoustics	30
Physical acoustics	88
Aeronautical and atmospheric sound	73
Music and musical instruments	60
Transducers acoustical	53
Acoustical measurement, instrumentation, signal processing	245

The employment of the members of the society includes:

Federal and State Government Departments and Agencies

- EPA, Workcover etc

Federally funded research Institutions

- CSIRO, NAL, DSTO etc

Universities

- academic, research and students

Large Companies

- motor industry, building materials etc

Engineering Consultants

- acoustics as one area of expertise

Acoustic consultancy

- acoustics as primary area of expertise

Instrument and materials companies

- sales and marketing

The education background of the members is diverse and includes engineering, science, electronics, architecture, building, psychology, physiology, music, etc.

The AAS comprises over 400 members within divisions in five states: Qld, NSW, Vic, SA and WA. Members in Tasmania are included in the Vic Division and those in ACT have a local group but are part of the NSW Division. Overseas members are included within their Division of choice. Each Division has a committee to manage the local operations. Two members from each Divisional committee comprise the Council of the AAS. The Council is responsible for the overall governance of the AAS and the participation with national organisations such as Standards Australia, Academy of Science, and international organisations, such as International Institute of Noise Control Engineering, International Commission on Acoustics etc. The Divisions organise technical programs and, in rotation, the national annual conference. An editorial panel of three publishes a journal three times per year. There is a range of membership grades from full corporate member through to subscriber member. Information on the AAS including details of the membership grades are available from the web on www.acoustics.asn.au.

The AAS is a member of FASTS which represents the interests of some 60,000 scientists and technologists from over 50 member societies in Australia. The list from FASTS of the top ten issues for 2003 are shown in Table 2.2. By their very nature these deal with broad issues facing the scientific and technological areas as a whole and are aimed at potential government action. The AAS needs to be prepared to maximise any benefits that may arise from actions that address any of these strategic issues.

Table 2.2 List of Top Ten Issues released by FASTS, 2003 [www.fast.org]

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| <p>1. AUSTRALIA NEEDS A MAP AND A COMPASS
 We have a 10-year plan for defence - why not for science and technology? We should plan for the future, set national goals, and ensure that science serves the national interest.</p> <p>2. BOOST FUNDING FOR UNIVERSITY SCIENCE
 Science and technology are expensive courses to run but vital to Australia's future. The special funding requirements of these courses need to be recognised by Government and universities.</p> <p>3. ENHANCE INDUSTRY INNOVATION
 Meet half the cost of employing new PhD graduates in industry for 2 years, to encourage industry make the best use of science in developing new products and improving existing ones.</p> <p>4. BRING ON "BACKING AUSTRALIA'S ABILITY"
 The Innovation Statement was the first step to re-invest in Australian science, but we continue to lag in international terms. It's time to take the second step and increase our national investment to OECD average by 2012.</p> <p>5. VIVE LA DIFFERENCE!
 Encourage universities to pursue individual excellence in teaching and research, rather than being clones of each other. Foster institutional cooperation on expensive equipment and joint projects.</p> <p>6. ENCOURAGE INDUSTRY TO BE INVENTIVE
 Give tax breaks on a sliding scale to companies prepared to invest more in research, because enterprising and inventive companies grow and provide more jobs.</p> <p>7. SCIENTISTS ADVISING PARLIAMENT
 Place scientists in Parliament for one-year secondments, to advise MPs on science-based issues such as water, salinity, energy sources of the future, climate change, health and resources.</p> <p>8. EQUAL HECS FOR SCIENCE AND MATHEMATICS TEACHERS
 Science and maths teachers are in short supply in Australia, but they still are forced to pay higher HECS fees than teachers in other subjects; and so they take home less pay.</p> <p>9. ATTRACT VENTURE CAPITAL INTO NEW INDUSTRIES
 Venture capital is in short supply. Make it more attractive to invest in new ideas and new industries by introducing new measure such as diminishing annual rates for capital gains tax</p> <p>10. IMPLEMENTING NATIONAL RESEARCH PRIORITIES
 Australia has adopted research priorities. Now we need to implement them, and find effective ways to measure the progress our science makes to meet the goals.</p> |
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3.0 METHODOLOGY

3.1 Consultation method

The first step in developing the top ten issues is to consult with the membership of the Society. There are a number of methods for this consultation and some of these methods include:

- discussion at annual general meeting
- discussion as a session of annual conference
- discussion at divisional technical meeting
- survey form distributed to all members
- survey of key personnel from representative areas (stakeholders)

For the initial development of the top ten issues the first three methods were rejected as the participants in such discussions may not be representative of the breadth of the membership. It is possible that these could be used to discuss, refine and enhance the issues once the first identification has been made. A survey of all members certainly has the potential to gain input from the membership as a whole. However, on past experiences, the number of responses to Society surveys has not been high. Should a good response be obtained, the outcomes may not be representative of all the areas and may be biased by the high number of members working in the 'noise' area.

The last option, namely a survey targeted at key personnel from all the areas was selected as providing the best opportunity to gather the information which could be used to formulate the draft of the top ten issues. This listing and the proposed action plans could then be promulgated to the membership as a whole seeking further input. It is envisaged that, just like the FASTS top ten issues, the AAS version will be updated annually to accommodate changes and to allow for input from all the interest groups within the AAS.

3.2 Implementation of Survey

In order to encourage a wide range of issues, it was decided to use an open ended format for the survey rather than a formal survey with a framework of potential issues. The following request for input was sent by email:

I am seeking your support, as, on behalf of the Australian Acoustical Society to identify the top ten issues of concern to the acoustics community in Australia.

The Society has been serving its membership on the technical side. As the Society enters its fourth decade and we see the erosion of some of the excellent acoustics facilities and organisations it is time to become proactive, to identify the issues that are of concern to the acoustics community and develop plans to address those issues. There are a number of means the Society can take action ie as a member organisation it can use the lobbying capabilities of FASTS; it has members in high positions in powerful government; non government and business organisation; its members themselves can be encouraged to take actions etc

The first step is to identify the top ten issues. On behalf of the Society, we are seeking responses from representatives of the main stakeholder groups in the Society and in Acoustics in Aust. The responses will be used in the "Future Directions" meeting to be held by the national council at the end of May and will be promulgated in the journal and become an 'action plan' for the society.

We would be grateful if you would list up to ten issues you consider are important to the acoustics community and need some action. If you can suggest the action that would be appreciated but not essential.

We would value your reply by end of April so that the findings can be discussed during the future directions meeting in May.

Thank you for your participation

This request for input was sent to representatives in the following areas:

- Australian Acoustical Society in Council area
- Australian Acoustical Society in publications area
- Australian Association of Acoustical Consultants
- Association of Noise Control Engineering
- University researcher in the architectural acoustics area
- University researcher in the mechanical acoustics area
- University researcher in the underwater acoustics area
- CSIRO Researcher in building and construction
- CSIRO Researcher in measurement laboratory
- National Acoustics Laboratory
- State environmental agency
- State Workcover agency
- Large company – psychologist

Around half responded to the first request. Following a reminder and some follow up phone calls responses were obtained from all on the list.

4.0 SUMMARY OF RESPONSES

As anticipated from such an open ended request, many of the responses were biased towards the area of particular interest to the respondent. However there were some issues that, although stated in different ways, were included in many responses. All the respondents provided at least three issues, most provided close to ten and some provided more than ten. Some also included some comments by way of guidance for actions that could be taken. The following attempts to categorise with a view to identifying the top ten and thence the actions plans.

Public face for acoustics

A 'public face' for acoustics in Australia is required. An effective presence would be ready to actively participate whenever there were opportunities to counter the concerns about the future of acoustics, the lack of educational opportunities, the promulgation of misleading information, the reduction in expertise in publicly funded organisations and agencies etc. It could also be pro-active to highlight the achievements of Australian acousticians and the opportunities for successful and satisfying careers in acoustics.

Future of Acoustics.

Many expressed concerns about the future of acoustics in Australia in particular because of the reduction of Government funding to research organisations, to universities and to state and federal agencies.

Staff reductions mean that research organisations and government agencies are not employing and training the young people to be able to maintain, let alone increase, the high reputation that has been achieved by Australian acousticians across a wide range of fields. This means the expertise will only be in those areas which are able to attract considerable funding from the private sector.

The requirement to generate funding has led to the closing and sale of government and hence independent acoustic test facilities. The CSIRO acoustic facilities in Sydney are to be demolished. The test facilities at CSIRO in Melbourne will only be

supported as long as there is an income stream from commercial testing. The sale of the National Acoustics Laboratory includes a lease back arrangement but this will lead to greater pressure for cost recovery and could lead to the demolition of the facilities. These are outstanding facilities which include the largest and quietest anechoic chamber in Australia and the reverberations rooms with the highest between-room flanking attenuation.

With no reliable and continuing source of external funding for public interest research in acoustics there is an increasing reliance on overseas findings which may not be directly applicable. For example in the environmental noise area there is a need for research which can be fed into the policy development process for important community concerns such as sleep disturbance, low frequency noise, transport noise etc. There is a need for collaborative research where the acoustics input is just one part of the team.

Education.

At the tertiary level there is a lack of recognition of the discipline of acoustics and in particular noise and vibration. Funding bodies, like ARC and DEST, do not have a category code for this area. Encouragement in the form of awards for outstanding student research projects and the publicity of achievements is a possible way to increase the profile of acoustics in the academic environment as well as in the community.

Promotion of the opportunities for a career in acoustics is required at the secondary and tertiary level. An up to date brochure highlighting the career opportunities is required.

There are many opportunities for employment in the private sector and there is a lack of graduates with some knowledge of acoustics for these positions. A variety of flexible courses are desperately needed. These include tertiary courses in acoustics providing comprehensive education at both the professional and technical level. Acoustics subjects as part of other relevant courses. Intensive short courses to

provide improve knowledge and skills for those entering the profession as well as refreshers for more experienced acousticians.

At the public level there is a need to provide better information on many aspects of acoustics so that public discussion on the topic is well informed and exaggerated claims are countered. Emotional issues such as the effects of noise on people, animals and sea life often appear in the media and there must be readily available means to ensure that replies from knowledgeable researchers are provided.

Information provided to the public on issues such as environmental noise is confusing due to the range of indices used for assessment. Guidance should be provided to the public to assist them to understand and interpret such information.

Professional issues

The AAS has a code of ethics and the implications of this code should be discussed and reinforced amongst the membership.

The AAS has strict guidelines for full membership but this is not the same as accreditation or certification that the member has a level of competency in a particular area. State and Federal agencies require some means to be sure that consultants have the required competencies.

There is inadequate policing of performance claims on products and some technical data is presented but not based on Australian or Internationally accepted standards. Legislative requirements for specifications on noise and vibration are not uniformly complied with.

The opportunities for careers in acoustics should be promoted and the profile of the profession increased.

Professional indemnity insurance is an increasing issue for any acoustician doing consulting work. The availability of insurance, in particular for those undertaking a small number of consultancies, is a problem. The extent of liability is also an issue of

concern for those who may be part of a larger team such as in building or road construction. Acoustics is bundled with other higher risk groups and so the premiums are unnecessarily high.

The adversarial role that is required of expert witnesses under the current legal system lowers the status of the profession.

Codes and standards in Acoustics

The delay in the proposed changes to the Building Code of Australia reflects poorly on acoustics in Australia. Most working in the area agree that the current standard is inadequate and agree with the proposed changes. Until the Code has been changed the inadequate performance meets the criteria.

The variation in environmental noise regulations and codes across all states adds to the confusion in the community and the various agencies need strong encouragement to come to agreement.

There is an urgent need for calibration and traceability of sonar systems and of ultrasound instruments used in medicine. The former is of great financial import due to the amount of business in Australia in this area and the latter because of the great potential for damage.

The applicability of International Codes and in particular EU directives needs to be examined. The acceptance of such guides may save duplication of research but this should only follow careful consideration of the local conditions.

There needs to be support for codes aimed at minimising the damage on humans from vibration, both hand arm, from use of tools, and whole body.

Acoustical Society

The Society needs to consider all possibilities to increase membership. The target group should be at the youth who should be encouraged to join and also to participate in all aspects of the society including the committees.

The Society needs to provide more professional support for members. This can include providing a good communication network, maintaining an adequate database, developing efficient methods to support members encountering difficulties etc. A survey is required to assess the needs and expectations of the current membership.

The methods of communicating with the membership should be examined and updated. The format of the state technical meetings, the national conferences and the journal of the Society all need to be examined to ascertain relevance and effectiveness.

While there is a range of subject areas in acoustics, the high numbers in the noise related topics means that less attention is paid to those areas with smaller numbers. The establishment of specialist subgroups could assist to counter this.

5.0 'TOP TEN' ISSUES

The issues listed in Table 5.1 have been developed from consideration of the points summarised in section 4. Suggested actions are based on evaluation of comments, follow up discussions with the respondents, with other members of the AAS and between the authors of this report. They were provided for discussion purposes at the Future Directions Workshop held 30 to 31 May 2003. These suggestions are limited to three groups, namely management of the AAS, members of the AAS and FASTS.

Table 5.1 Summary of Top Ten Issues with suggested actions.

	Issue	Suggested Options for Actions
1	Public face for Acoustics	<p>AAS to have primary contact for media.</p> <p>This person be re-active and always willing to comment or find appropriate expert to comment. Aim is to balance incorrect and emotional reports. This person should also be pro-active to initiate informed discussion in the community on acoustics. Guidance from FASTS to be obtained.</p>
2	Educate the youth on acoustics	<p>AAS to establish education sub committee with first task to compile list of current tertiary courses in acoustics.</p> <p>AAS then to actively promote increased availability of formal courses and subjects in acoustics</p> <p>Education subcommittee to seek input from senior academic on means to achieve a Research Field Discipline and Subject Code (RFCD) for Noise and Vibration (under Division 290000).</p>
3	Improve the education of those in acoustics	AAS to encourage intensive short courses on all aspects of acoustics
4	Retain and expand publicly funded acoustic facilities	AAS identify the key facilities under threat and contacts for those who can provide the justifications for continuation. Lobby of government with FASTS.
5	Retain acoustic expertise in publicly funded organisations and agencies	AAS to identify the key expertise under threat and contacts for those who can provide the justifications for continuation Lobby of government with FASTS.
6	Retain reputation of profession	AAS to establish description for suitably qualified acoustic consultant for use by government agencies.

		<p>AAS to establish a register of competencies for consultants</p> <p>AAS to regularly remind the membership of the code of ethics and publish in Journal biennially</p> <p>AAS to investigate breaches of code and misrepresentation of data.</p>
7	Grow the AAS	AAS focus on youth for expansion of membership and involvement in activities.
8	Involve all members	<p>Survey to find out what current membership wants.</p> <p>AAS to provide framework for specialist sub groups.</p>
9	Professional support - legal, insurance etc	AAS, with help from AAAC, to establish a single contact for professional support for members
10	Encourage research	AAS to establish a list of priority topic for public interest and public funded research in Australia. AAS with assistance from FASTS lobby Government Departments and agencies to support research in these areas.

11 As a reserve issue - AAS to have a higher profile in e setting of standards and require regular reports from its representatives on standards and other committees and to take action when long delays in implementation are encountered.

6.0 FUTURE DIRECTIONS ACTIONS

The workshop on Future Directions was held on 30 and 31 May and discussion on the actions relating to the Top Ten Issues occupied most of the second day. The participants at the workshop included the Councillors, two from each State Division, the General Secretary, two from the journal editorial committee (one of which was the moderator for the day) and a NSW committee member. Actions to address most of the issues were agreed to at the workshop and ratified at the Council meeting on the following day. These actions are summarised in Table 6.1.

Table 6.1 Actions on Top Ten Issues for Acoustics in 2003

	Issue	Agreed Actions
		<p>An Occasional Paper be prepared highlighting the problems and possible solutions facing acoustics in Australia and so deal with many of the top ten issues. This paper to be used to lobby government and to be launched with support of FASTS. Paper to be prepared by Burgess to be used during the Meet the Politicians Day organised by FASTS in October 2003.</p> <p>A member survey be undertaken with results compiled by end of 2003.</p>
1	Public face for Acoustics	The current President, Ken Mikl, be identified as the primary media contact for the AAS. Procedure for promoting this to the media and preparing media policy document to be discussed with FASTS.
2	Educate the youth on acoustics	<p>Subcommittee convened by Byron Martin to prepare list of courses on acoustics in Australia and the list to be placed on the web.</p> <p>Three senior academics be encouraged to prepare a submission for the creation of a Research Field Discipline and Subject Code (RFCD) for Noise and Vibration.</p>

3	Improve the education of those in acoustics	It was agreed that short courses on all aspects of acoustics should be encouraged but no specific actions from AAS at this time.
4	Retain and expand publicly funded acoustic facilities	The draft letter tabled at the workshop should be used as a basis for lobbying government. Ken Mikl and Neil Gross to liaise with FASTS on the best way to proceed.
5	Retain acoustic expertise in publicly funded organisations and agencies	These issues would feature in the Occasional Paper described above
6	Retain reputation of profession	A formal process of accreditation was considered beyond the scope of the AAS at this time. A “self regulated” listing to be implemented based on members selecting their areas of competency and relying on them abiding by the Code of Ethics. The listing to be updated annually and available from the web.
7	Grow the AAS	Member survey to include request for details of potential members. President’s editorial in Acoustics Australia to urge members to encourage others to join the AAS.
8	Involve all members	Survey to include questions to assess if there is a need and AAS to act upon responses. AAS to work in cooperation with other relevant organisations. As a first step AAS to agree to arrange 2 sessions at the Aust Institute of Physics Congress in Canberra in 2005. Burgess to be the liaison with AIP.
9	Professional support - legal, insurance etc	The Australian Association of Acoustical Consultants (AAAC) has some capabilities to provide assistance. AAAC be urged to promote itself in Acoustics Australia.
10	Encourage research	No specific actions – to be referred to in the Occasional

		Paper
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7.0 CONCLUSION

A study has been undertaken to identify the top ten issues of concern to the acoustics community in Australia at this time. Based on the responses from key stakeholders within the acoustic fraternity a consolidated list of key issues has been developed. Directions for actions to redress the problems identified and that utilise the resources available to the AAS were used as the basis for discussions at the Future Directions Workshop held by the AAS. Selected actions were agreed to at that workshop and the Council committed to implementation.

Acknowledgement

This study was undertaken via an education grant from the AAS. The various respondents contacted during the preparation of this report are thanked for their input to the study.