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What are the requirements to make acoustics a vital force, both at home and overseas, during the next fifteen years? The reply made by the Australian Acoustic Society to a series of questions covering this topic are presented, with the expectation of generating further discussion amongst Society members and thereby creating a broader based response to such challenging questions.

**INTRODUCTION**

What will be the role of acoustics in fifteen years time? Will environmental noise still be a significant problem in Australian communities? By the 21st century, how can we ensure an acoustic-based innovation will receive funding and a smooth path to the markets of the world? What is potentially the most important area for development within acoustics and how can we ensure it succeeds?

These are thought-provoking questions – but rather difficult to answer. So often such questions are brushed aside: “we’ll think about them later”.

Well, later came rather sooner than expected, when the AAS was asked at the end of 1994 to respond to a questionnaire on the future needs of acoustics in Australia.

**BACKGROUND: FUTURE NEEDS**

“Matching Science and Technology to Future Needs” is the thrust of a study which the Australian Science and Technology Council (ASTEC) initiated [1] in August/September 1994. They seek to establish what Australians think will be the most important issues, problems and priorities facing us until the year 2010, and what role science and technology will play. Responses are being sought from individuals as well as specialised groups such as the Acoustical Society. ASTEC has set up a committee to evaluate and report on the responses. This should lead to an information base which can direct industry and government about the future development and application of science and technology.

Unfortunately, the requested time frame for responses was very short; preferably by October 1994 or if this was too short, then February, 1995. Council of the AAS decided to prepare a response for the latter date, but even then the reply had, of necessity, an input from only a few people, especially as the interval included the much loved “Australian Holiday” time. The resulting response is the compilation of ideas from several Divisions and some individuals and has been sent to

ASTEC as requested. However, was it the best response? Does it accurately reflect the overall attitude of AAS members? Do you agree with or violently object to the answers?

Reproduced below are the seven main questions from ASTEC and the responses provided by the Society. Would you have included quite different ideas or examples? Please read and consider the response and let me know YOUR thoughts on the issues. It is too late to change the present response, however, consideration of the issues may stimulate fresh ideas and help form the basis of how government sees acoustics progressing in the future.

**QUESTIONS AND ANSWERS**

*1. For members of the Australian Acoustical Society what are the most promising areas or fields of research, development or commercialisation where significant achievements are expected over the next 15 years?*

Active control of noise and vibration is seen as the major single area of advancement.

Prediction models for control of noise, especially environmental noise. Applications such as estimating outdoor sound levels around airports, global temperature monitoring by long distance acoustic propagation over oceans.

Refinement of current theoretical modelling approaches; such as boundary element analysis, finite element analysis and wavelet theory, and their application to more complex acoustic systems.

Medical acoustics: effect of noise on humans; both psychological and physiological aspects.

Noise regulations; especially governing Occupational Noise/Control in, say, the mining industry.

Better building construction improved sound isolation and shielding.

Acoustical instrumentation:

development of medical diagnostic techniques, intelligent transducer technology, including miniaturisation, more efficient sound generating devices, speech processing technology.

*2. For your area of expertise, what do you consider will be Australia's strengths in the most promising areas or fields of research, development or commercialisation over the next 15 years?*

The expertise and skill of the people and the facilities within Australia, such as Universities, manufacturing and mining industries, provide a strong base for selling to overseas markets, particularly south-east Asia, high quality

acoustic products and technology.

Australia can be a leader in setting standards and regulations.

3. *If things went very well, looking at it optimistically, what specific types of significant achievements do you think might be possible in these promising areas or fields over the next 15 years?*

Australia could become the "acoustic centre" of the south-east Asia region.

Australian based companies, involved with acoustic consulting and building products, etc., would expand in Australia and overseas. They would sell to overseas markets Australian intellectual property, technology, training skills and regulation ideas. Specific examples might include; practical applications of active noise control including development of low frequency noise attenuators for vehicles and industry, bionic ears and hearing aids, smart miniature transducers, improved acoustic building materials and designs.

4. *In what ways will these types of significant achievements address important needs in the Australian economy, or contribute to the health and well-being of Australian society over the next 15 years?*

Create an improved lifestyle for Australians through reduction of environmental noise.

Less hearing damage through an improved acoustic environment in residential and industrial areas and in transport. Much of this improvement will be achieved by application of advanced materials and acoustic techniques, especially where noise control was previously impractical.

Improved export market.

Longer operating life of machinery and reduced maintenance costs after application of vibration diagnostic techniques. An example would be quieter mining and processing.

5. *For your area of expertise, what weaknesses or threats do you consider might limit Australia's success in the most promising areas or fields of research, development or commercialisation over the next 15 years?*

University and other research bodies have very restricted funding and there is a poor Government attitude to promoting science.

Noise in the environment is losing its profile and therefore attracting less funding. Community values are often ignored when other things are assigned higher priorities through political decisions - eg. Sydney airport runway.

Overseas competitor companies will bypass Australia. Cost of manufacture in Australia is relatively high and there is a lack of business development skills. Australia has a small population and industry base and there is a lack of "risk taking" when considering applying new technologies.

6. *Can you identify any special requirements for Australia's success in promising areas or fields of research, development*

*or commercialisation over the next 15 years? eg. requirement for major contributions from multi-disciplinary research or from overseas.*

Industry should contribute more to research and development, with stronger Government support for co-operative research and assistance to industry to understand commercialisation of technology.

Increased tax breaks for organisations which implement new technologies.

Government should promote and sustain bodies like EPA and Universities which are already involved in noise regulations and acoustic research. Funding to such areas should be increased.

Government must ensure companies have the ability to market overseas and there is protection of technology and intellectual property.

7. *Looking at ways research is now carried out, or the results are developed and commercialised, what changes, apart from additional resources, might help ensure optimistic achievements in promising areas or fields are realised over the next 15 years?*

Education of the community, industry and Government about the importance of noise in the environment and what technologies are available to reduce levels - increasing noise consciousness.

Compilation of statistics showing effect of noise.

Close links between Industry, Government and Universities in the area. Provision of adequate research funding, or tax exemptions, for projects which are likely to lead to commercial success.

Provide a more flexible system in Universities for top researchers to concentrate on research with only minimal teaching and administrative commitments and provide simple paths for interchange of personnel with industry.

## WHAT TO DO NEXT

Having read the responses, whether in complete agreement or in total disagreement, please drop me, Charles Don at the address given at the top of this article, a short note indicating your thoughts. If you are in dispute, just indicate the question number and point which troubles you and then let me have your ideas. Even if you completely agree, (Is such an unlikely event even remotely possible?) I would be grateful if you let me, and therefore the Society, know that the response was "correct". No matter what your response, all comments will be given consideration by Council in the future and, if the opportunity arises, incorporated in a new version of future needs.

## REFERENCE

1. Australian Science and Technology Council (ASTEC), *Matching Science and Technology to Future Needs: Background Report*, August 1994.