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The Manager
Australia in the Asian Century Taskforce
Department of Prime Minister and Cabinet
P O Box 6500
Canberra ACT 2600

Dear Sir

The Australian Academy of Technological Science and Engineering (ATSE)[1] welcomes this opportunity to express views on the *Australia in the Asian Century: Issues Paper*. ATSE believes that the preparation of the proposed White Paper is very timely. ATSE's main interest relates to the final question in the Issues Paper:

> "How well positioned is Australia to connect productively with Asian countries in relation to innovation, research and development, including transfers and collaboration of knowledge and skills?"

However many of our comments are also relevant to other discussion points in the Issues Paper. ATSE believes that international collaboration in science, technology and innovation (STI) is critical to Australia's technological development and economic growth. It also contributes to other Australia policy objectives in the region.

Science and technology policy has played a significant role in Australia's foreign policy objectives over the years. Government can use international research collaboration to build closer relations with other countries, particularly those in our region. One example of this is the dividend that Australia has gained through research collaboration with Indonesia, extending back to the period when Dr Habibie was Indonesian Minister for Research. A more current example is the goodwill that Chinese-Australian researchers are generating through research collaboration with the country from which they have emigrated.

The number of bilateral science cooperation agreements that Australia has signed with other countries illustrates this point. In seeking to develop relations with other countries, science cooperation has been seen as an activity that builds bridges and provides mutual benefits. Further, science cooperation under bilateral agreements is usually directed towards mutually agreed priorities.

In addition, some of the challenges Australia faces (e.g. global warming, satellite communications) are global in character and require a science and technology based response. Again, STI collaboration plays a key role.

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[1] The Academy was established in 1975 and is one of Australia's four learned national Academies, which have complementary roles and work together both nationally and internationally. The Academy has about 800 elected Fellows comprising the leadership of applied science and engineering across the country.

Overseas examples

Australia is not alone in this use of science cooperation to develop closer links with other countries. For example, U.S. Secretary of State Hilary Clinton noted in 2009[2] that:

> "... science diplomacy and science and technology cooperation between the US and other countries is one of our most effective ways of influencing and assisting other nations and creating real bridges between the United States and its counterparts."

Science diplomacy is both *science for diplomacy* and *diplomacy for science*. In other words, diplomacy often needs scientific inputs when dealing with issues ranging from terrorism to trade, while at the same time, diplomacy is a useful tool in furthering national scientific objectives. In the USA, a major National Academies of Science report[3] in 1999 set out new directions in US science diplomacy, many of which are applicable to Australia today.

Other OECD countries take a similar view to the USA. For example, the British Foreign Secretary, David Miliband made the case for using science as a political bridge in a speech to a conference in London in 2010.[4] The Royal Society released a relevant report at this conference.[5]

More recently,[6] U.S. Deputy Assistant Secretary of State for Science, Space and Health, Lawrence Gumbiner stated that international science and technology cooperation builds lasting relationships. He noted that, while science has always transcended borders, the current level of global interaction among scientists is unprecedented. He also noted that science "opens doors" even with countries where political and economic relations are difficult or complex. Mr Gumbiner cited President Obama's 2009 speech[7] to the U.S. National Academy of Sciences (NAS):

> "So many challenges that science and technology will help us meet are global in character… That is why my administration is ramping up participation in and our commitment to international science and technology cooperation across the many areas where it is clearly in our interest to do so."

ATSE is a unique organisation, with the objective of promoting the application of scientific and engineering knowledge to practical purposes for the benefit of the nation's well-being and economic development. ATSE's strong commitment to international research collaboration flows directly from this mission. ATSE recognises the importance of this activity through the commitment of its own resources together with support from other sources including the Australian Government.

In recognition of the synergistic relationship between international cooperation and innovation and research, ATSE focuses on applied research activities wherever possible. We are able to draw on our membership base of Australia's outstanding academics, industrialists, engineers, technologists and entrepreneurs to achieve applied commercial outcomes.

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2 Clinton, H R 2009, *Remarks at the Town Hall on the Quadrennial Diplomacy and Development Review at the Department of State*, 10 July 2009, available at www.state.gov/secretary/rm/2009a/july/125949.htm

3 National Academies of Sciences 1999, The Pervasive Role of Science, Technology and Health in Foreign Policy: Imperatives for the Department of State, available from www.nap.edu/catalog/9688.html

4 See http://royalsociety.org/Miliband-urges-greater-role-for-science-in-diplomacy/

5 Royal Society and AAAS 2010, New frontiers in science diplomacy: Navigating the changing balance of power, January 2010, London available at http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2010/4294969468.pdf

6 National Academy of Sciences 2011, *Examining core elements of international research collaboration: summary of a workshop,* Washington DC.

7 Obama, B 2009, *Remarks by the President at the National Academy of Sciences Annual Meeting*, 27 April 2009.

Box 1

An example of benefits from joint workshops

An Australia-China ICT/Embedded Systems Workshop, held in August 2007 resulted in the establishment of Australia-China Research Centre for Wireless Communications. CSIRO Information and Communication Technologies Centre joined forces with the Beijing University of Post & Telecommunications with A$2m total funding. Both countries are now at the leading edge of future wireless communications technologies, including the development of 4G and 5G mobile networks.

ATSE has strong collaborative and strategic linkages internationally through bodies such as the International Council of Academies of Engineering and Technological Sciences (CAETS) and formal bilateral arrangements with sister academies worldwide.

ATSE has established long term, trusted relationships nationally and internationally and is recognised by the countries with which we work for our ability to harness excellence in science and technology within a framework of cultural understanding. These pathways have led to tangible benefits for Australian research and business. We believe that strengthening of Australia's STI cooperation is vital.

ATSE's engagement with Asia

ATSE has helped to build relations between Australia and countries including China, Korea, Japan, India, Vietnam, Singapore and Taiwan. ATSE has done this by organising exchange scientist visits, missions and joint workshops. Examples of each of these are provided below.

ATSE and the Engineering Academy of Japan jointly operate an Emerging Research Leaders Exchange Program funded by the Australia Government and the Japan Society for the Promotion of Science that involves mid-career exchanges with Japan.

The Australia China Young Scientist Exchange Program has proved to be highly effective model for introducing future science and technology leaders into the research and innovation systems of countries at very senior levels. An example of the extent of outreach achieved though scientific visits is illustrated in Box 2.

Box 2

Analysis of an exchange visit

Analysis of the Chinese exchange activity in August 2009 showed that for just one exchange scientist with an energy research interest, ATSE:

- Raised the cv and research profile of the visiting scientist with 75 ATSE Fellows who are recognised leaders in their field, of which some 20 ATSE Fellow were met the visiting scientist during the visit;
- The ATSE Fellows provided a further 30 contacts with other key researchers;
- Overall some 15 Institutes/Universities/CSIRO were engaged in the visit and are now aware of the linkage with China;
- Some 13 host research units were engaged, involving on average ten lead scientists per host, resulting in a total of 130 research staff meeting directly with the Chinese visiting scientist;
- A further 75 researchers attended various talks and lectures given by the visiting scientist.

Thus, this one visit resulted in direct high-level contact and discussions and positive collaboration with 130 Australian scientists.

The importance of science, technology and engineering cooperation in our relations with Asia

China and India are now at the forefront of some fields of science and technology. Thus there are significant potential economic benefits from Australia expanding its STI cooperation with these countries. At the same time, enhanced cooperation will lead to better understanding between Australia and countries in Asia. These can be beneficial to Australia's relations with countries in the region.

A Prime Minister's Science, Engineering and Innovation Council (PMSEIC) report *Strengthening Australia's position in the new world order*,[8] provides evidence of Asia's progress in STI and discusses the consequences for Australia. The report emphasises the importance of maintaining Australia's competitive position through investment in STI and through cooperation with countries in Asia.

Barriers to greater STI cooperation

The major barrier to enhanced STI cooperation in the Asian region is funding. Despite a positive review and recognition of the value of international collaboration, the International Science Linkages (ISL) Program, administered by the former Department of Innovation, Industry, Science and Research was terminated on 30 June 2011. While some Australian Research Council grants include small amounts of funding for international cooperation, because of shortfalls in funds allocated to projects, very little international cooperation is supported in practice. Unlike most research cooperation that has been supported under bilateral science agreements, researcher-driven international cooperation funded through the ARC is not focussed on mutually agreed priorities.

Further, the former ISL program provided small grants to the Learned Academies in Australia, including ATSE, under the ISL-Science Academies program. The ISL SAP funds were utilized to build high level collaborative relationships supported at a government-to-government level. These programs have proven to be highly effective in not only forging research to researcher linkages but in developing institutional collaboration and in a highly cost effective manner (see the attached Table).

The lack of funding for science cooperation under bilateral (and some multilateral) agreements is currently a source of national embarrassment. While approximately $10m per annum is available through the Australia India Strategic Research Fund, a very much smaller amount of funding is available under the bilateral agreement with China. Cooperation under the science and technology agreement with Korea now relies entirely on small amounts of funding provided through the Australia Korea Foundation.

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8 PMSEIC 2006, *Strengthening Australia's position in the new world order*, Canberra, June 2006, available at http://www.innovation.gov.au/Science/PMSEIC/Documents/AsiasScientificAndEconomicGrowthOpportunitiesForAustralia.pdf

Recommendations

In the past, the Department of Foreign Affairs and Trade has taken a strong interest in science and technology cooperation/diplomacy. For a period, the Department had its own Science Adviser. While this interest never reached the levels currently found in the US State Department, it provided a central focus for Australia's international science relations.

The U.S State Department has had a Science Adviser since 1999 who not only coordinates science advice to that Department but also acts as a science ambassador to other countries. He recently spoke about his role to the President's Council of Advisers on Science and Technology. [9] The State Department manages the U.S. science counsellor network, ensuring that appointees have both scientific and diplomacy skills and integrating them into operations at overseas posts. More importantly, the State Department manages the U.S. bilateral science cooperation agreements.

Recommendation1: The Department of Foreign Affairs and Trade should take a stronger role in science diplomacy. Consideration should be given to transferring responsibility for Australia's overseas science counsellor network to DFAT. DFAT should also lead a whole-of-government approach to international science cooperation that currently is split between a number of agencies in fields as diverse as health, agriculture, education and climate change. DFAT should also have central responsibility and the appropriated funds for science-related bilateral collaboration programs and agreements.

Recommendation 2: A new funding program should be established to support bilateral and multilateral science cooperation. Such a program needs sufficient funds to be able to match the support provided through these agreements by other countries. These funds should be separate to and in addition to any funding for individual research projects through the ARC or the NHMRC.

Yours faithfully

Robin Batterham
President

cc Chief Scientist

[9] See the video on http://www.tvworldwide.com/events/pcast/120106/default.cfm?id=14251&type=flv&test=0&live=0

Attachment

TABLE SHOWING ATSE ENGAGEMENT IN THE REGION

ATSE Contract Activities 2005-2010	Number of Delegate Days		Number visited/ engaged with		Collab links formed	Govt funding excl GST	Dollars leveraged by ATSE	Total cost/value of activity	Leverage factor delivered by ATSE
	Aust	O /S	Aust	O/S					
Australia-Singapore Emerging Research leaders Exchange Program	96	73	175	118	yes	$100,000	$360,000	$460,000	3.6
Australia-Japan Emerging Research leaders Program	97	86	87	N/A	35	$100,000	$360,000	$460,000	3.6
Australia-China Young Scientists Exchange (China to Australia)		98	132		yes	$100,000	$360,000	$460,000	3.6
Australia German RTM/ W/shop on Advanced Solar PV (Australia)		84	147		yes	$83,150	$332,600	$415,750	4.0
Australia-EU W/shop on smart technology for healthy longevity (Paris)	84	60		36	yes	$117,453	$352,359	$469,812	3.0
Indo-Australia W/shop on Biomedical Devices	60	100	12	50		$50,000	$110,000	$160,000	2.2
sub totals	**337**	**501**	**553**	**204**		**$550,603**	**$1,874,959**	**$2,425,562**	
Australia-Taiwan W/shops (Sustainable Water & Energy tech - low carbon future) Sydney		80	25		yes	$50,000	$159,237	$209,237	4.2
Australia-China Young Scientist Exchange (China to Australia & Australia to China)	96	98	150	267	yes	$100,000	$320,000	$420,000	3.2
sub totals	**96**	**178**	**175**	**267**		**$150,000**	**$479,237**	**$629,237**	
Indo-Australia Transgenic Crops Workshop	60	36		10	yes	$50,000	$140,000	$190,000	2.8
Australia-China Young Scientist Exchange (Australia to China)	97			315		$40,000	$120,000	$160,000	3.0
subtotals	**157**	**36**		**325**		**$90,000**	**$260,000**	**$350,000**	
Australia-India Joint Sustainable Energy W/shop (Sydney)	85	50	28			$50,000	$150,000	$200,000	3.0
Australia-Taiwan Bio/Nano Melbourne	129	54	67			$50,000	$150,000	$200,000	3.0
Australia-China Young Scientist Exchange (China to Australia)	72		143		yes	$60,000	$180,000	$224,000	3.0
subtotals	**286**	**104**	**238**			**$160,000**	**$480,000**	**$624,000**	
TOTAL	**876**	**819**	**966**	**796**	**0**	**$950,603**	**$3,094,196**	**$4,028,799**	**3.2**