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Asian Office of Aerospace Research and Development (AOARD) Overview

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2012 AFOSR SPRING REVIEW

NAME: Ken Goretta (Misoon Mah as of 25 March 2012)

BRIEF DESCRIPTION OF PORTFOLIO:

Within Australasia, research grants, conference grants, travel support, and personal engagement in direct support of AFRL and in collaboration with other DoD and federal offices. Portfolio mirrors closely that of AFOSR.

LIST SUB-AREAS IN PORTFOLIO:

Broad coverage, with considerable focus on materials sciences, nanoscience and nanotechnology, electronics, and information science.

AOARD 101

- Context and constraints
- Opportunities
- Tools and their use
- Recent results
- Prognosis

Engagement of Australasia

- **Large area, huge and diverse population, rapid economic growth and strong investment in S&T**
- **Comparatively few countries of interest, but many obvious centers of excellence within them**
- **Useful relationships generally require time to build:**
  - **Constancy is a cardinal virtue**
  - **Important to build on past successes – relationships can be leveraged**
  - **Small staff and limited resources (energy, time, funds) militate toward partnering with colleagues in AFRL, Army and Navy, other US agencies, and with foreign researchers and funders**

Opportunities by Country

- **Japan:** 3rd largest economy and publisher of S&T papers. Strong across the board, with new and growing emphasis on green innovation and quality of life. Superb equipment and low costs for projects. Our engagement has grown year after year since 1998.
- **Korea:** Working relations with MEST and MKE and long-term relationships with the major universities and labs provide entry points in most areas of S&T. Korea is broadly strong; our interests are focused primarily on nanoscience, materials and electronics, and brain science.
- **Taiwan:** Working relations with all major universities and NSC provide entry points in most areas of S&T. Taiwan targets investments. We focus primarily on nanoscience and, recently, information science.
- **Australia:** Economy strong, with growing investment in information and communications, nanotechnology, autonomy, mining and infrastructure, space science, and biotechnology. We target its excellent universities and very strong national research centers (e.g., NICTA in information science).

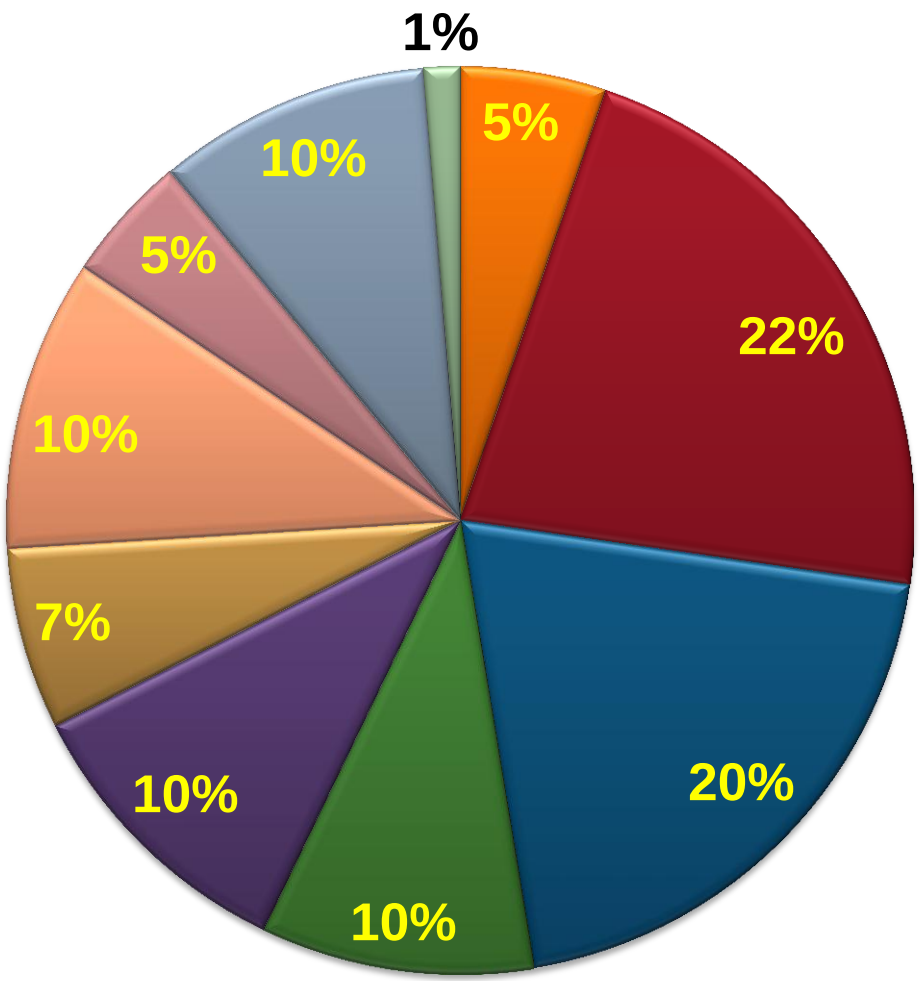
Opportunities by Country (2)

- **India:** Growing investment in research. Oct 2005 bilateral S&T agreement has helped us engage. Several strong institutions, but significant fraction of the S&T is of little interest to the AF. Value found in aerospace, materials sciences, power and energy, space, and information.
- **Singapore:** R&D spending is pegged to reach 3.5 % of GDP in 2015, with emphasis on biotechnology, information sciences, and physical sciences and engineering. Interconnected S&T community allows for access to full spectrum of engagement, civilian to military.
- **Others:** Innumerable opportunities to invest in brilliant individuals.
- **China:** 2nd largest economy and publisher of S&T papers; growth rates high. Limited direct engagement, with approval from OSD required.

Approaches

- **Personal relationships are usually required:**
  - **Face-to-face engagement is often needed to establish useful relationships; conference support provides one good mechanism**
  - **Visits by researchers are cost effective and inevitably helpful**
  - **Relationships are generally transitive, but regional and cultural expertise is highly useful (e.g., we employ two Japanese scientists)**
- **Research grants constitute the majority of the effort to promote advances and assure transition to the AFRL and other:**
  - **Small seed grants generally appropriate to prevailing costs**
  - **Larger grants (funds from others) bring a broader mix of talent**
  - **Follow-on grants generally nurture partnerships:**
    - **Foreign PIs are generally well supported domestically**
    - **AFRL is a prized research partner**

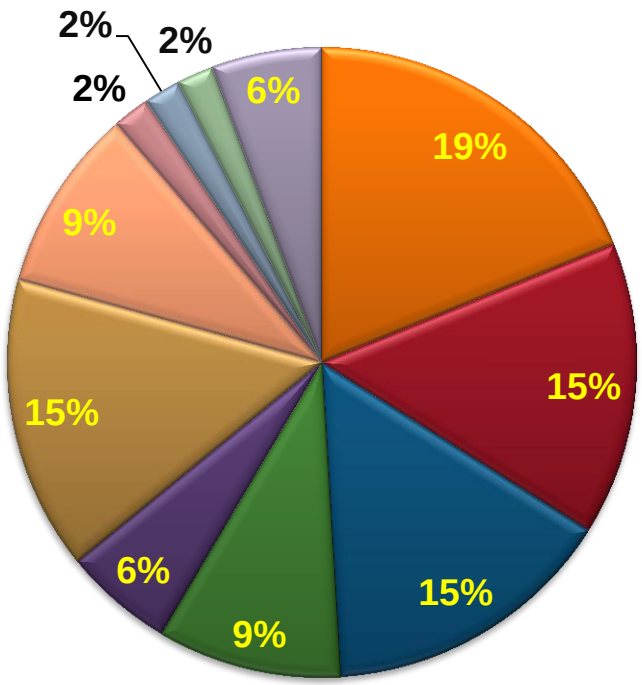
Research Grants/Contracts



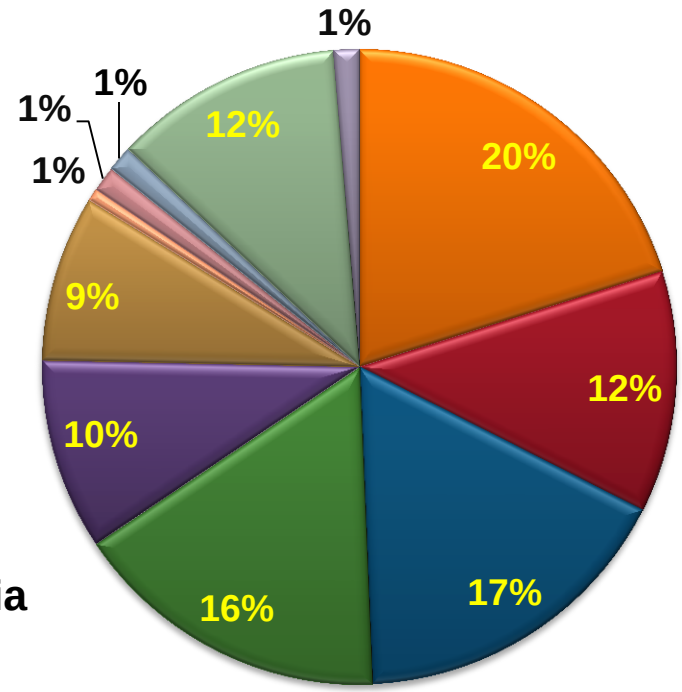
- Aero-Structure Interactions & Control
- Complex Electronics & Fund. Quantum Processes
- Complex Materials & Structures
- Decision Making
- Energy, Power & Propulsion
- Dynamical Systems, Optimization & Control
- Information & Complex Networks
- Natural Materials & Systems
- Optics, EM, Comm & Signal Processing
- Plasma Physics & Nonequilibrium Processes

Grants and Contracts

53 conferences



154 research projects



- Japan
- Korea
- Australia
- Taiwan
- India
- Singapore
- Thailand
- Malaysia
- Other Australasia
- US/Canada
- EU

Future

- **Australasia will continue in the near term to outpace the world in economic growth, and many of the key countries will continue to invest strongly in S&T:**
  - **We have ready access to most of the region**
  - **China is expected to emerge as the dominant research entity, but the extent to which we will engage its research community remains to be decided**
- **Our network of useful relationships is strong and extensive and will continue to expand significantly**
- **The trend toward increasing partnerships and sharing of funds should continue**

Questions?

Economies

Country/ Region	Pop (M)	$GDP (PPP)	$GDP (exch)	$GDP (per cap)	2010 growth	Comp. rank	GERD (PPP)	GERD (per GDP)
Japan	126	4.3T	5.5T	34,000	4%	9	152.1B	3.5%
Korea	49	1.5T	1.0T	30,000	6.1%	24	52.7B	3.4%
Australia	22	0.88T	1.2T	41,000	2.7%	20	20.6B	2.3%
Taiwan	23	0.82T	0.43T	35,700	10.8%	13	20.7B	2.4%
India	1,189	4.1T	1.5T	3,500	10.4%	56	38B	0.8%
Singapore	5	0.29T	0.22T	62,100	14.5%	2	8.2B	2.6%
China	1,337	10.1T	5.9T	7,600	10.3%	26	174.9B	1.6%
USA	313	14.7T	14.7T	47,200	2.8%	5	427.2B	2.8%
EU (27)	492	14.8T	16.1T	32,700	1.8%	--	326.7B	1.9%

Data from CIA World Factbook; World Economic Forum; Battelle's 2012 Global R&D Funding Forecast