

“Innovation, collaboration and industrial linkages”

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Opening Remarks

Thank you to Alex Zelinsky for inviting me to participate in what is an impressively innovative event aimed at your direct hacking of an organisation that serves such an important function for our nation.

Today I'd like to focus on the importance of taking a systems-focus to encouraging innovation and the benefits that it offers. This means seeking the right opportunities for collaboration between academia and other researchers, businesses, and government, both domestically and internationally. It also means having the institutional structures in place to facilitate the transfer and application of knowledge and allow the entrepreneurial activities of realising ideas getting products to market.

They are big issues that I am very much focused on in my role as Chair of Innovation and Science Australia, about which I'll now provide an overview. I'll

then offer a few observations on the importance of improving the integration between Australia's broader innovation, science and research system and the impressive work of the DSTA and the defence community more widely.

Background to ISA

Innovation and Science Australia, ISA, is an independent statutory board tasked by the Federal Government to provide advice as to how Australia can improve its innovation performance. In late 2015 I was invited to chair this board, now comprised of leading innovators, researchers, and private sector practitioners in innovation, including Chief Scientist Dr Alan Finkel as Deputy Chair.

ISA has a broad remit of providing whole-of-government policy advice on all aspects of Australia's Innovation, Science and Research system (or 'ISR system'). In January 2016 we had two immediate priorities; firstly to conduct a performance review of the ISR system and measure our performance against competitor nations. Secondly, develop a Strategic Plan for the ISR system out to 2030. These priorities are additional to our on-going responsibility for oversight and evaluation of performance of the Government's policy interventions and legislated programmes.

The Performance Review

Our Performance Review of the ISR System was released in February this year.

The Review developed a novel performance framework for assessing the innovation system and generates a unique scorecard by which we will be able to assess Australia's performance against our peer competitor nations into the future – these being the OECD, Taiwan, China, and Singapore.

Our innovation performance is determined by three key activities: how well we create knowledge, how well we transfer that knowledge to different parts of the system, and how well our businesses apply knowledge in developing new goods and services and bringing them to market.

The scorecard tracks our performance in 20 key metrics relating to the three key activities of knowledge creation, transfer and application.

Our strength is clearly in knowledge creation; in both our number of researchers per capita and the proportion of highly-cited publications produced, we sit in the top ten internationally. We are an inventive bunch.

When it comes to our commercialisation however, our performance is less impressive.

So the key challenge for lifting the performance of Australia's innovation, science and research system is how to get a step-change in the commercialisation of our inventiveness.

I'd be surprised if that didn't resonate with many of you here. Have you generated IP that never translated into service? What do you think would have helped and what impediments could and should have been avoided?

ISA's Performance Review is not an end in itself – indeed it makes no recommendations. But it does provide a baseline of evidence to enable us to suggest what we can all do to turbo charge national innovation outcomes.

2030 Strategic Plan

It is the starting point for the development by ISA of a 2030 Strategic Plan for the Australian innovation, science and research system. We are well underway with this and will deliver our recommendations to government in Q4 this year.

To develop the Strategic Plan we've seconded a taskforce of experts from

across government, business and the research sector, including Dr Todd Mansell from DST.

Our vision for Australia in 2030 is as follows:

We want an Australia counted within the top tier of innovation nations, known and respected for its excellence in science, research and commercialisation.

Innovation, underpinning a diversity of internationally competitive industries, will enable today's and future generations to have meaningful work, and a great quality of life, in a fair and inclusive society.

Achieving this vision requires a focus beyond any three year election cycle.

Accordingly, our Strategic Plan will make recommendations across three time horizons:

- improving the current system in the short term; (3 to 5 years);
- adding new capability in the medium term; (5 to 8 years); and
- realising transformative options in the longer term out to 2030.

Based on our findings in the Performance Review we have identified 6 key challenges as work-streams core to the development of our Strategic Plan out to 2030. I will mention each of these challenges and speak to those with most relevance to DST.

The six key challenges are:

1. Moving more firms, in more sectors, closer to the innovation frontier

Australia already has some firms and sectors that are world-class, and others that have the potential to become so. We will need to continue to support our innovation leaders, while encouraging the emergence of the next generation of breakout firms. Defence industries are a prime candidate in my opinion.

2. Moving and keeping Government closer to the innovation frontier

Governments operate significant public enterprises and are Australia's largest employers. We need governments to lead by example and set new global benchmarks for innovation best practice.

Federal Government procurement of approx. \$60b pa represents a significant annual spend. Reducing the cost of doing business with government,

simplifying procurement and compliance obligations, and maximising the resultant innovation outcomes for the nation has serious potential upside.

Government must work to be both a trusted partner and, importantly, a demanding customer. This ensures taxpayers get the greatest value out of government expenditure and produces better performing firms. Defence is a stand-out opportunity for this demonstration.

Government currently does and must continue to play a critical role in sustaining a healthy and growing national innovation system – and the commonwealth and state science agencies (e.g. CSIRO, DST, ANSTO), Universities and state based MRI's, are all key to driving system performance and connectivity; we must build from this strong base.

3. Delivering high-quality and relevant education and skills development for Australians throughout their working lives

4. Maximising the engagement of our world class research system with industry and end users

5. Maximising advantage from international knowledge, talent and capital

Evidence indicates that higher levels of global engagement correlate with higher levels of innovation. Ongoing community support for greater global engagement will depend on political leaders communicating the benefits that international knowledge, talent and capital flows bring to our community.

Again, Defence is a stand-out opportunity for significant expansion of export of innovative products, components and services.

6. High Impact initiatives (Moonshots)

Finally, in developing the Plan we are considering the value of recommending major initiatives with scale that can deliver significant direct and spill-over benefits to the innovation system and broader economy.

Australia is already engaged in ambitious domestic initiatives, including in advancing quantum computing, novel medical products like the bionic eye, and is a participant in large global initiatives such as the next-generation Square Kilometre Array radio telescope.

DST of course has produced large-scale technological advances. The Over the Horizon Radar or the Weapons Research Evaluation Satellite could be considered a moonshot of its time.

A broad base of sustained support would be required to pursue our own large-scale initiatives, or “moonshots”.

Maybe there are some more moonshot ideas among the DST team today?

DST and the 2030 Plan

Of these six challenges, challenges 1 2 and 4 re: engagement between industry and research are probably of the most direct and immediate relevance to DST.

Challenge 1: Getting More Defence Firms Closer to the Innovation Frontier

Innovation is not a linear process in which knowledge is generated in research organisations and passed to business for development. For an organisation like DST it's important that high-quality IP doesn't just sit on the shelf of industry players who may lack the access to the development pathway. Nor

should IP sit on the shelves of Defence for lack of engagement with industry entrepreneurs. How many of you have endured this frustrating experience?

Firms not being able to fully participate in the innovation and commercialisation processes due to a lack of scale or an inability to interface with primes, represent a significant challenge for the innovation system. We need more examples like Miranda and Quickstep's supply of components for the Joint Strike Fighter fleet; how can we remove any unnecessary barriers to achieving these outcomes?

This is not just about supply of components to the 72 JSF aircraft purchased for Australia but supply enabled by Lockheed Martin to the 3,000+ fleet of JSFs worldwide.

Defence Industry Minister Christopher Pyne recently stated that the "global supply chain" program, begun in 2009, has led to \$830 million in contracts awarded to more than 140 Australian SME's and organisations

Products and services provided to the supply chains of defence primes

including Boeing, Raytheon, Thales, Rheinmetall, Lockheed Martin, BAE Systems, Northrup Grumman.

What else can we do to ensure that capabilities are built through SMEs and delivered, where appropriate, by primes who hold invaluable positions in global supply chains?

(eg) Perhaps structures could be put in place so that primes are made aware of emerging partnerships between DST and SMEs with high-value IP, for example, during the Nextgen Tech and Innovation Hub phases of DST engagement.

Perhaps this would encourage primes to factor these developments into their planning and to form relationships with the SMEs at an earlier stage in the commercialisation journey.

We should recognise that these relationships come with some risks for SMEs.

By playing the lead coordinating role in this facilitation, DST could perhaps bake in safeguards against primes and Defence demanding IP handover on premature and non-commercial terms..

Challenge 2 and 4: Government as Defence Innovation Driver and Engagement with Industry:

Ensuring that we make the processes of engagement and collaboration between, research, business and government as seamless as possible is a real challenge for government, but one that needs to be met.

This can include both procurement processes and the mechanisms government uses to partner with business; greater agility in these areas would provide a real boost to the innovative businesses who currently feel they are being shut out from providing novel solutions to government's pressing challenges.

Government agencies need to ask themselves whether the practices they follow in arranging collaborations and partnerships with industry are resulting in the best commercialisation outcomes.

So DST holds critical knowledge about the scientific and research challenges facing Defence.

You are in a unique position to communicate these challenges as unclassified R&D problems that can be addressed by universities and firms.

A strategic approach to working with and improving linkages within the ISR system and DSTs position in the broader network of knowledge production and application presents big opportunities for driving commercialisation outcomes from research breakthroughs.

There is a clear link here to Challenge 1: the more integrated our ISR system is and the more easily knowledge flows within it, the more commercialisation opportunities emerge for our firms. This is why a systems-level approach to the IRS system is key concern for ISA and I think at DST you need to reflect on ensuring you have the linkage strategies in place to get the most from your position within the broader ecosystem.

And there are some good initiatives currently in place from Government aimed at creating and reinforce linkages between research and industry.

The Cooperative Research Centres (CRC) programme is designed to offer improvements to the competitiveness of key Australian industries by taking demand-driven approaches to solving problems identified and led by business.

Each CRC offers the prospect of first-to-world products and services. The Defence CRC program will be doing this in a defence context and the Trusted Autonomous Systems DCRC has been announced as the first to receive funding. The CRC approach has worked well in other contexts and I'm hopeful it will offer real benefits to the defence industry.

The Industry Growth Centres Initiative is facilitating growth in 6 key industry sectors where increased collaboration for innovation abounds (eg) in global supply chains.

The Centre for Defence Capability is similarly the cornerstone of the government's strategy for getting defence-industry partnerships where we need them. The CDIC targets defence industry development, critical skilling and export initiatives and offers a great opportunity to assist in building on DST's links to industry. It already provides a well developed portal for SME's

seeking information, tender docs etc and is providing connection and advise re relevant networks in primes and Defence.

Thales: A Case Study in Success

The benefits to the commercialisation capacity of the ISR system from coordinating research with commercial activity are illustrated in success of Thales Underwater Systems' development and production of ceramic sonar sensors.

Thales' position as the world leader in sonar sensors is the fruition of pioneering work of DTS in the 1970s and 80s.

A subsequent spin-off from the military application of the towable array business provided the Sentry and Guardian solid streamers for the civilian seismic industry. This has resulted in \$350m in export revenues for Australia.

This case highlights the real value-add that collaborative engagement can provide. We're talking about IP developed by Australian researchers that was commercially realised by a prime acting in accordance with DST and the Royal

Australia Navy's strategic priorities and able to leverage linkages on a global-scale.

It's also given a huge boost to Australia advanced manufacturing sector. TUS are now a Tier 1 participant in the Advanced Manufacturing Growth Centre formed in 2016, where they will share insight into linking other Australian advanced manufacturers into global supply chains.

The success that Thales has enjoyed in bringing Australia to the forefront of innovative ceramic sonar technologies through collaborative engagement with our world-class researchers provides a lesson for the broader defence industry and indeed across all sectors of the economy.

This is what we need more of - commercialisation success stories resulting in improved capability for our military forces **and** positioning Australia as a vendor to global supply chains in an increasingly integrated global economy.

Concluding Remarks

Collaborative engagement between Australian businesses and our world-class knowledge-producing research organisations will turbo-charge our development of new-to-world products and services. This promises to provide both economic benefits to the country and significant improvements to the daily lives of all Australians.

Our increasingly globalised and interconnected world presents wonderful opportunities for great ideas and IP to be developed into great products and services. This is the case in defence, health, agriculture, and other key sectors of the economy.

The defence sector will almost certainly play an increasingly prominent role in our national economy over the coming decades. The continued success of agencies like DST that operate at the forefront of our innovation system is vital to ISA's goal of Australia becoming a top tier innovation nation by 2030.

DST has now moved into a phase of implementing and delivering on carefully considered strategic work. I look forward to watching the results of this work

and the impact that you have on the Australian innovation system. And I think that DST and Defence will be recognised as an exemplar across government. And your success will result in similar frameworks and approaches being applied to areas like health and education.

In the spirit of today's event I'd like to leave you with a couple of questions for you to consider:

- What can you personally do to question and improve current pathways to the commercialisation of your research output?
- How can you better engage with other researchers, SMEs and primes to get more and better capability in the hands of our Defence forces while also creating greater industrial commercialisation for defence and non-defence markets around the world?

Thank you.