

Department of Defence, Science and Technology

Closing dinner – Emerging and Disruptive Technology Assessment Symposium (EDTAS) on Space Technologies

**Address by the Honourable Kim Beazley AC
Governor of Western Australia**

Wednesday, 6th March 2019

I would firstly like to acknowledge the traditional owners of the land on which we meet – the Noongar people – and pay my respects to their elders past, present and emerging.

I should also acknowledge here distinguished guests. Firstly Minister Linda Reynolds – congratulations on your appointment as Minister for Defence Industry. Your experience fits you well for this job. Your career has led almost seamlessly to this point. I know you will immerse yourself in this job to the advantage of the Defence of the nation.

Andrew Seedhouse, Chief National Security and ISR Division, DTSG. Your organisation is a massive security asset for our country and it is good to see you taking the lead in discussion here.

Rachel Cooke, US Consul General. Our alliance is a military alliance sustained by diplomacy. You have been a superb advocate in your time here.

Anthony Murfett, Deputy Head, Australian Space Agency. Great to have your wisdom and the opportunity you bring this State with your attendance.

Professor Peter Klinken, our peerless Chief Scientist.

But in a major way, the Vice Chancellors and Pro Vice Chancellors. Your collaboration has been critical for this conference and in what it represents in the combined activities of our powerful tertiary institutions. I don't think the public appreciates what powerful establishments our universities are – the significant research establishments of our State.

The Criticality of Space and Vigilance for Emerging Threats

DSTG is now and has been for years one of our most, and at times arguably our most, important defence asset. Our population size, location, neighbourhood, and strategic geography demand a superior, nimble and in many ways unique technological defence competence. We are one of only a few countries which determine to defend ourselves. That can only be done affordably through a relationship with a technologically brilliant great power and effectively through our ability to acclimatise, embellish and occasionally invent the means of our defence.

This Conference has been about emerging and disruptive technologies with a primary reference to space. We can only discuss this sensibly because we have the DSTG. They keep a granular inventory of needs and capability before government. That is its strategic contribution. That contribution is augmented strategically and tactically by DSTG's active involvement with enhancing the weapons systems we acquire and based on that, identifying what more we may need and helping to invent it. Australia spends about \$500 million on Defence science annually, and for a 10 year

investment of \$5 Billion, ACIL Allen reporting suggests this investment delivers about \$20-25 Billion in value.

Priorities now are AI, hypersonics, robotics, cyber security, E.W. – all areas for tackling emerging disruptive technologies. Interestingly, in the Defence Innovation Program, Space is categorised as a priority one domain, ranked above land combat and amphibious operations which are category three priorities. The operating characteristics of all our incoming expensive platforms will be augmented, enhanced by work on aspects by the DSTG including the effectiveness of the weapons in our environment and effectively in net assessment of those they combat.

DSTG is a ticket to the top table with our allies and friends. Sometimes advancing our mutual interests. Sometimes filling in holes collaboration leaves. Before I talk a little about things immediate I want to talk illustratively about two I was familiar with:

1. OTHR – developed independently by DSTG at first collaboratively then on our own.
2. Nulka – most effective passive defence, something of a disruptor in its own right.

Both systems harden our defence and our war fighters against disruption. OTHR is a brilliant product of DTSG. The system has the capacity over a large part of the region to substitute for stricken satellites on early warning and tracking. Nulka has proved resilient to counter measures constantly adjusted as new developments occur. A powerful protection for ours and allied shipping.

These capabilities are legacy but still of relevance. More important is that our ally and our own government are prioritising disruptive technology and threats in space as vital.

As outlined in the 2018 US National Defence Strategy new threats to commercial and military uses of space are emerging, while the increasing digital connectivity of all aspects of life, business, government, and military creates significant vulnerabilities. According to the 2019 Worldwide Threat Assessment these vulnerabilities include the proliferation of new antisatellite weapons and other space-based disruptive technologies.

As General Campbell noted last month at the Track 1.5 US-Australia Indo-Pacific Deterrence Dialogue: new technologies *“are creating new realities in which some countries can circumvent the rules-based order through power projection, including by extending their reach beyond traditional geographic notions of territory and sovereignty.”*

As outlined in the 2016 Defence White Paper, *“the strategic environment over the next 20 years will be shaped by complex nongeographic threats, such as the threats in cyberspace and space. The security environment of the future, both in peacetime and during armed conflict, will feature increased threats from offensive cyber and space-based capabilities.”*

The Australian Defence Force relies on space for strategic intelligence and tactical warfighting. Recent investments, like \$500 million to improve Australia's space-based intelligence, surveillance and reconnaissance capabilities, recognise the military's sustained and perhaps growing dependence on space. Vulnerabilities here are increasing as satellite systems are targeted for disruption or destruction.

When we look at game changing, counter disrupting areas, one counter measure Australian research and firms are engaged with is the idea of defending by swarming.

Nobody can truly anticipate all space-related game changers, even though the genesis of such watersheds may be hiding in plain sight. Swarming using much smaller and hard to target platforms is nothing new, but nano satellites could well prove to be a game changer, not only for the evasion of kinetic or electronic attack, but in maximising target saturation.

For a more humanitarian application, in this case equatorial communication for developing nations, I am buoyed by the Israeli company Sky and Space Global, and their plan to launch 200 nano satellites with backing by a Perth-based co-founder. Aside from the growth in the emergence of private industry with the likes of SpaceX, even smaller players like Sky and Space Global are finding space more accessible with the development of technology.

Another possible watershed could be 3D printing. Lend me your imagination. It may be more likely than not that a decade or so from now, some defence and space assets will simply be printed from scratch. A researcher at the Massachusetts Institute of Technology suggests we could soon even be using 3D printing to create small factories in space – even by sourcing space debris to melt and re-use it.

Explorations of mining the moon or asteroids might quickly be dismissed due to excessive costs of returning resources to earth. But, perhaps, when considering manufacturing via 3D printing ‘on-site’, the possibilities increase significantly.

One of the valuable features of this Conference is psychological – the acceptance of responsibility. If we are serious about survival we need to be deeply embedded in the discussions – the constant need for changing architecture, the intensified pressure for measures and counter measures, is a spinning wheel we can’t dismount.

Following on from this, the US-Australia Alliance is integral to our space-based capabilities. We are deeply embedded. Former Defence Secretary Mattis never missed an opportunity to stress for us the significant character of the US inclusion of us in the US national technology and industrial base as an enabler. As we discuss these issues, the work we do here is at the heart of the global competition.

The creation of the Australian Space Agency is indeed exciting. We do however have much to be proud about in Australia already.

Professor Brian Schmidt’s address to ASPI’s ‘Building Australia’s Strategy for Space’ forum in June 2018, spoke of an exhaustive list of Australian expertise including:

- world leaders in secure quantum communication via lasers;
- top 3 or 4 in the world in imaging and spectroscopy despite being funded a mere tenth of our nearest competitor;
- world renowned expertise in Fedsats (microsatellites) and Cubesats (miniaturized); and
- world leading in square kilometre array, and also Over the Horizon Radar technology.

WA and Space

We are a good ally to have. Our Joint Facilities, particularly the new space based facilities in our North, are critical for our allies and ourselves.

Well why have a conference on this here?

WA offers a critical geography for the future of space:

- Airbus advised me that Wyndham offers the world's most predictable weather patterns – critical to their potentially game changing hand-launched high altitude solar drones that essentially substitute satellite technology.
- I am advised that a senior NASA official notes that WA's geography was optimal for space launches. I understand that this was because of a desirable trajectory to 'slingshot' to a useful location in space, while complementing the State's proximate distance from the equator.
- Our sheer size offers vast radio silence opportunities – WA now has two world-renowned space precincts in the Murchison and Mingenew regions; one a 'telescope precinct' and the other rapidly emerging as a 'satellite and antenna precinct'.
- Our joint space assets in Exmouth, critical, as mentioned before.
- WA is one of the few places on earth where both NASA and the European Space Agency are actively engaged.
- Curtin University's Space Science and Technology Centre is home to the largest planetary research group in the Southern Hemisphere. The Centre's work includes joint space surveillance projects with Lockheed Martin – they can identify space objects as small as 50cm wide from 25,000 kilometres away.
- We also possess two super computers capable of processing anything space sciences require – I am advised that for the purpose of the Square Kilometre Array the Pawsey Super Computer alone processes the equivalent of the entire Internet's worth of data every second. It is not even the State's most powerful super computer.
- Perhaps above all is the value of the learning in artificial intelligence, robotics, information technology, big data mining and the major deployment of these technologies in our mining industry. It is a big user of satellite observation and data but it generates processes routinely which are critical to advances for the space agenda.

So what does all this mean? Well WA alone has enormous space related capabilities – an incredible foundation to help Australia to build upon, keep apace and even innovate beyond the front runners in certain emerging space technologies.

Finally, I commend the work of DST in working with our State Government and universities in progressing the establishment of a Defence Science Centre to support security and technology development in WA. After all, the State is home to various world leaders in automation and software development for the mining sector, a sector which sees many dual use technologies at play in space and beyond.