Discussion paper response
Submission No 15a

INQUIRY INTO DEFENCE INDUSTRY IN NEW SOUTH WALES

Organisation: Defence Material Technology Centre (DMTC) Limited

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DMTC welcomes the opportunity to make a supplementary submission to the NSW Legislative Council Standing Committee on State Development, following the release in November 2017 of the discussion paper entitled "*Defence Industry in NSW: Discussion Paper*".

Our submission provides further input on a number of the questions raised in the discussion paper.

Background

DMTC is an independent, not-for-profit company that operates in the Australian defence and national security context. Our programs enhance Australian Defence Force capability through collaborations that boost Australian industry capability and capacity and are underpinned by Australia's world-renowned research expertise.

While it is headquartered in Melbourne, DMTC is a national endeavour and works with a range of industry and research partners across NSW. DMTC activities currently underway or envisaged to commence in 2017 involve work located in Sydney's CBD and its surrounds, as well as the Hunter, the Illawarra and Monaro regions.

DMTC programs and projects operate on a co-investment model, an approach that allows each partner to leverage the expertise, investment, human resources and capabilities of the other partners. DMTC projects would not succeed without active contributions from each project partner. DMTC contracts with Defence and national security customers, industry and the research sector, and applies a consistent and proven model for project definition, management and delivery.[1]

Question 5: Sovereign Defence Capability

Notwithstanding the current work within Defence to define, identify and manage sovereign industrial capabilities (the outcomes of which were yet to be released at the time of writing this submission), DMTC's view is that a broad view of capabilities needs to be taken. This would necessarily include underpinning technologies, sub-components and supply chain capacity, not just market-ready products and platforms.

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[1] More detail on DMTC's governance and operating model is available in our initial submission to the Committee's inquiry (Submission No. 15) which is available here - https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/58247/0015%20Defence%20Materials%20Technology%20Centre%20(DMTC)%20Limited.pdf

Question 18: Space-related developments

DMTC has established a program to further develop and enhance Defence capabilities in the *Space* domain. The DMTC High Altitude Sensor Systems (HASS) Program is focused on the development of enhanced sensor components and on-board processing of sensor data for small Unmanned Aerial Systems (UAS), micro-, nano-, and cube-satellites (high altitude systems with a payload capacity of ≤ ~ 5kg). There is significant relevance to the Defence sector, particularly with regard to space-borne technologies which enable situational awareness of areas of denied access, provision of data in real-time, and a sovereign manufacturing capability for small satellite technology.

Leveraging an initial CSIRO investment of $2.7 million, it is envisaged that the HASS program will create a total program of work valued in excess of $6 million over four years.

In early 2017, DMTC sought expressions of interest from potential industry and research partners to enhance Defence capabilities and build Australian industrial capacity in High Altitude Sensor Systems. The initial call for proposals was very successful, receiving 36 expressions of interest featuring collaborations involving more than 40 organisations from across the research and industry sectors. Selected proposals were then invited to submit detailed proposals, which were subject to more rigorous assessment.

The expressions of interest that were received demonstrated a broad, emerging base of Australian capability and innovation in space systems, with significant opportunity for growth and commercialisation. Evident areas of capability strength include:

- hyperspectral sensors with low size, weight and power;
- passive radar systems;
- compact high-sensitivity receivers;
- advanced alloys and additive manufacturing processes; and
- on-board processing and compression of large volumes of satellite data.

All four of the projects that were eventually selected and announced by the Minister for Defence Industry in September 2017[2] involve at least one industry or research partner from NSW. DMTC is actively seeking opportunities to expand the program in the near and longer term [this relates to both opportunities to build the base by attracting investment from Defence and other sources to support new projects, and also to the potential to increase contributions to the program by adding new partners to existing activities as the projects get underway and advance along the technology readiness continuum].

The Australian space industry sector is relatively nascent compared to the sectors DMTC traditionally works within[3], and lacks a well-established and networked end-to-end supply chain. The establishment phase of the HASS Program has already taken the first steps towards addressing this, by bringing together a broad range of stakeholders and

[2] https://www.pyneonline.com.au/media-centre/media-releases/space-sensor-research-kicks-off

[3] such as land vehicles, maritime structures, aerospace machining, high performance materials, biomedical technologies and innovative manufacturing solutions

facilitating the establishment of new partnerships between the research sector, Australian space start-ups and SMEs, and multinational aerospace primes.

The ADF has always relied on space-based assets to provide situational awareness during operations, exercises and training, as well as to provide intelligence on the capabilities and activities of foreign organisations where required to protect our national interests. To date however, the space-borne assets Australia has accessed have largely been traditional large satellites built, owned and operated by our allies.

Over the past decade an emerging global capability for disruption of large form factor satellites and availability of open-source and commercial earth observation data (e.g. proprietary products including Google Earth) have eroded the reliability and strategic advantages imparted by our access to satellite data through alliances. More recently a series of large international primes and small start-up companies (e.g. Gilmour Space Technologies and Rocket Lab) have been established to bring small payload (e.g. cubesat) insertion into low earth orbit capability to the Oceanic region.

Given these recent developments, and Australia's already established strengths in satellite communications and navigation, a gap has existed in our ability to field satellite hardware and sensing capability of appropriate size, power and weight for cubesats. This is an emerging technology area where Australia could become a global leader[4].

The Australian Geospatial-Intelligence Organisation's recently announced Defence Project 799 (DEF 799) demonstrates the consideration the ADF is giving to sovereign space capabilities. DEF 799 is a $500 million investment[5] to improve Australia's space-based ISR capabilities to support ADF operations. The program initially focuses on the acquisition of commercial satellite imagery, but Phase 2 will consider the possible acquisition of a sovereign geospatial intelligence space surveillance system, which would create significant opportunities for Australian companies in this sector in the 7 – 13 year timeframe.

During the establishment phase and any subsequent opportunity to grow the DMTC HASS activity, DMTC will work with federal and state government agencies and industry associations towards advancing the maturity of Australian technologies and capabilities. By targeting, connecting and investing in Australian start-up companies, SMEs and local nodes of international primes, we are working to grow the depth and breadth of Australian industrial capability in space sensors. In doing so, we hope to underwrite the development of future supply chains and Australian industry's maturity to supply products for use by Defence and potentially for export to allied defence forces. The aim is to encourage and support development of a critical mass within the Australian industrial base that can act as a reliable and cost-effective source of payload hardware far into the future.

A secondary, but significant, consideration in relation to space-borne technologies is that the sensing and earth observation capabilities desired by Defence have potential dual-use

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[4] See also LTCOL Greg Rowlands "Making a case for Space: The Small Satellite Value Proposition" accessed here https://www.army.gov.au/our-future/blog/cyber-space/making-a-case-for-space-the-small-satellite-value-proposition

[5] http://www.defence.gov.au/ago/geoint-def799-satellites.htm

application in response to civil/commercial challenges. For example, space-borne hyperspectral sensors can be used to derive information significant to amphibious combat, but can also be used to remotely monitor the health of food crops. The ability to extract and classify military targets of interest from a real-time data stream is equally useful when inspecting large pieces of civil infrastructure such as the national power grid.

DMTC is encouraging these opportunities to be identified as a critical element in developing a stable and healthy industrial base. We look forward to working with the community to grow Australia's space capabilities, particularly in support of national security and Defence outcomes.

There is a role for federal and State Governments and their relevant coordinating departments to encourage and sponsor these opportunities for research-industry and industry-industry collaboration, as well as opportunities for horizontal integration and dual-use applications.

Question 21: SME sector and "Defence-readiness"

Through its partnership with the Defence Innovation Hub and engagement with the Centre for Defence Industry Capability, DMTC is helping to build a more capable and defence-ready industrial sector. DMTC has a strong focus on engaging small to medium enterprises (SMEs) in its research and development activities, equipping them to be 'defence-ready' and to be competitive for work within prime contractors' supply chains and to take full advantage of export opportunities.

One example of this work and the benefits it has already realised was discussed in the Committee's public hearings[6] and is included in the case study in Chapter 3 (page 46) of the Discussion Paper.

DMTC's Industry Capability Development Program aims to create a network of 'Defence-ready' companies with benchmarked, globally competitive capabilities. It has a strong focus on engaging SMEs in its research and development activities and equipping them to participate in prime contractors' supply chains. In the particular example cited in the Discussion Paper, DMTC is collaborating with the University of Wollongong and Swinburne University to enhance SME capabilities in the welding of high-strength steels.

[6] Evidence from University of Wollongong (29 June 2017) and DMTC (3 August 2017)

Industry Capability Development

DMTC

Building industry expertise

Module One

- Focus on regional areas with companies with readily transferable capabilities to the defence sector (e.g. resources, automotive)

Module Two

- Connect the leading companies in each area to create a national network of capability
- Prime involvement to set context detail

Module Three

- Continued optimisation, innovation and R&D insertion with supply chain partners
- Maintain world's best practice

The multi-phase program involves process benchmarking and technology transfer activities with research partners and with support from the Centre for Defence Industry Capability (CDIC) and relevant certification partners. It aims to build capacity and open doors to opportunities in the Defence sector. It also provides mentoring and evidence-based feedback on what SMEs need to do to improve skills.

DMTC's approach to the Industry Capability Development program:

- Leverages our existing relationships and experience of working with major primes (such as BAE Systems, Thales, Naval Group and others)
- Builds on the success of previous benchmarking pilot activities in Computer Numerically-Controlled (CNC) machining, in precision tooling and additive manufacturing
- Aligns with the Australian Government's focus on Australian industry as a Fundamental Input to Capability, and on optimising Australian Industry involvement in Defence programs and
- Responds to historic concerns regarding the patchy nature of Australian industry capacity and competitiveness, and in particular the understanding of the levels of certification and accreditation that international prime contractors require of their supply chain partners.

For Australian industry, and for SMEs in particular, the program offers:

- productivity improvements through benchmarking and expert oversight
- Up-skilling opportunities in identified areas for improvement
- Access to and interaction with world leading technologies located within the research sector

- Technology transfer to solve technical problems and support companies to be more competitive
- Opportunities for SMEs to interact with Defence Primes
- exposure to best practice techniques and processes and
- insights into quality, safety and certification standards expected by international primes and by Defence.

DMTC's activities focus on development of industry capability, rather than a specific product. As such, platform independent activities (such as welding productivity improvements) can be addressed independently of design or prime contractor selection, by focusing on supply chain improvements and setting context through global best practice benchmarks, standards and quality frameworks. Future expansion of the Program is envisaged and may include additive manufacturing and casting techniques, and technologies critical to the digitalisation of manufacturing.

Through the agency of *Defence NSW*, the NSW Government could engage with DMTC to provide funding and coordination support for future Industry Capability Development programs along technical capability theme or regional lines.

Conclusion

Across all of DMTC's broad program of activity, our strong focus is on applied R&D and the industrial application of, not just developing concepts for, advanced manufacturing technologies. While it is not the only measure, the creation of start-up companies to commercialise technologies - based on unique scientific discovery, sustained research and innovative application - is a great feature of successful technology development ecosystems.

DMTC's collaboration with research partners such as the University of Wollongong, in particular, and with industry partners such as Thales Australia has been exemplified by a determination to stay in front of the technology curve, and will help a broad range of startup and established Australian companies to reach and maintain globally-competitive levels of performance.

Points of Contact

Further information can be provided on request. Points of contact are listed below:

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