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11 October 2018

Submission to the State Development, Natural Resources and Agricultural Industry Development Committee

DMTC welcomes the opportunity to provide a submission to the inquiry into job creation opportunities in Queensland arising from the establishment of an Australian space industry, that was established by the Queensland Parliament on 6 September 2018.

Our submission provides commentary and coverage of issues relevant to the first four of the five terms of reference for the committee.

KEY POINTS

- DMTC has a key role in the Defence innovation system, and in advancing technologies in priority areas for the benefit of ADF capability and Australian industry capacity.
- Success in the defence sector, and in innovation and technology development in particular, is widely accepted as a 'long game'. Technologies can take many years to develop and mature, and this requires discipline and perseverance but also a standardised approach.
- DMTC activities are strongly focused on the industrial application of advanced manufacturing technologies.
- Our collaborations with both long-time and new industry and research partners exemplify a determination to help Australian industry stay in front of the technology curve, and to help a broad range of startup and established Australian companies to reach and maintain globally-competitive performance benchmarks.
- There is a role for Federal and State Governments and their relevant agencies to encourage and sponsor opportunities for research-industry and industry-industry collaboration, as well as opportunities for horizontal integration and dual-use applications of new technologies.

Defence Materials Technology Centre (DMTC) Limited is an independent, not-for-profit company that operates in the Australian defence and national security context.

DMTC operates a flexible, open innovation approach based on standard engagement principles - underpinned by internationally-recognised ISO 9001 quality framework accreditation - that facilitate the involvement of both competitive and complementary industrial supply chain partners.

One of the keys to DMTC's success is its ability to catalyse strategic activities, leverage capability and investment, and deliver genuine collaboration.

DMTC invests in the translation of technology from TRL4 to TRL7 or 8, capitalising on previously under-exploited basic or fundamental research. The Defence Science and Technology (DST) Group, as the primary science adviser to Defence, is a DMTC participant and directly supports a number of DMTC's research projects.

While headquartered in Melbourne, DMTC is very much a national endeavour. DMTC was established in 2008 and has enjoyed bipartisan support in its pursuit of better outcomes for Australia's warfighters.

DMTC projects & programs 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. This genuinely collaborative model provides the pathway to creating industrial capability by solving complex challenges articulated in the defence and national security context. DMTC's standardised approach to contract management and project oversight removes an administrative burden for industry partners and allows them to direct all resources to realising project outcomes.

High Altitude Sensor Systems

DMTC has established a program to further develop and enhance Defence capabilities in the *Space* domain. The DMTC High Altitude Sensor Systems (HASS) Program seeks to make a significant contribution to the growth of the Australian space industry and to the development of sovereign space capabilities for Australia.

The HASS Program was established in 2017 with an initial CSIRO investment of $2.7 million, and its first projects commenced in 2018. It is envisaged that the HASS program will grow to realise a total program of work valued in excess of $6 million over four years.

With its focus firmly on developments in the Australian defence and national security context, the HASS Program is taking shape and is already achieving technical milestones.

Detailed advice and direction is provided for the DMTC HASS Program from a range of Defence stakeholders including DST Group, Air Force Headquarters and the Australian Geospatial-Intelligence Organisation. Technical experts Dr Kimberley Clayfield and Dr Roy Hughes have been appointed as Program Leader and Specialist Technical Adviser respectively. Both Dr Clayfield and Dr Hughes are based in Queensland. Dr Clayfield is seconded from CSIRO while Dr Hughes is a DST Group Senior Fellow (retired).

In early 2017, DMTC sought expressions of interest for its HASS Program from potential industry and research partners. 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. Four projects were eventually selected and announced by the then Minister for Defence Industry in September 2017[1].

The first project to get underway is directly addressing limitations in the current system for sea-state monitoring, particularly with regard to data capture, refresh rates and data fidelity. Some of the early work on this project has utilised a commercial-off-the-shelf unmanned aerial vehicle (the Boeing Insitu CT220) as a test platform.

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

DMTC is actively seeking opportunities to expand the program in the near and longer term, by both attracting additional investment from Defence stakeholders and also by adding new partners to existing activities as the projects mature and advance along the technology readiness continuum.

The Australian space industry sector is relatively nascent compared to the sectors DMTC traditionally works within[2], and lacks a well-established and networked end-to-end supply chain. The HASS Program represents a contribution to addressing this challenge, by bringing together a broad range of stakeholders and facilitating the establishment of new partnerships between the research sector, Australian space start-ups and SMEs, and multinational 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.

The Australian Geospatial-Intelligence Organisation's Defence Project 799 (DEF 799) demonstrates the consideration the ADF is giving to sovereign space capabilities. DEF 799 is a $500 million investment[3] 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 DMTC HASS program activity, DMTC will continue to work with federal and state government agencies and industry associations to build on the depth and breadth of Australian industrial capability in space sensors. We look forward to working with the newly established Australian Space Agency and the broader community to grow Australia's space capabilities, particularly in support of national security and Defence outcomes.

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[2] Examples of DMTC work since its inception in 2008 include development of: battery technologies and fuel cells; blast protection technologies; design and fabrication enhancements for protected mobility vehicles; automotive welding and maritime fabrication; corrosion prevention, detection, remediation and repair; titanium supply chain improvements; composite materials; and detailed studies to map Australian industrial capacity in specific technology areas.

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

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

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.

Growing Capacity: Industry Capability Development

As a not for profit public company, DMTC exists to build deep expertise and intellectual property in Australia that can be exploited for our Defence customer and for Australian industry.

DMTC's Industry Capability Development Program aims to create a network of 'Defence-ready' companies with benchmarked, globally competitive capabilities. The program aims to foster collaboration between local small- to medium-sized enterprises (SMEs) and build a more cohesive national picture of regional capability that can be presented to prime contractors for major Defence projects.

DMTC's Industry Capability Development Program aims to:

- validate the capabilities of both individual companies and (after a process to anonymise the data) regional hubs through process benchmarking and technology transfer activities;
- capitalise on the expertise and support from existing DMTC research partners, the Centre for Defence Industry Capability (CDIC) and relevant certification partners;
- enhance capacity and open doors to opportunities in the Defence sector; and
- provide mentoring and evidence-based feedback on the steps that SMEs need to take in order to improve skills and overall productivity.

Earlier this year the Queensland Government, through Defence Industries Queensland, confirmed funding for DMTC to conduct workshops in four regions to assist manufacturers to maximise opportunities to enter defence industry supply chains, in this case related to the welding of specific grades of steel required for maritime and land applications.

Through the DMTC program, platform independent activities (such as welding or advanced manufacturing) can be addressed independently of design or prime contractor selection, by focusing on 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.

Following on from the example cited above with Defence Industries Queensland, the Queensland Government could engage with DMTC to provide funding and coordination support for future Industry Capability Development programs that are focused on specific space or advanced manufacturing related capabilities across the State.

Points of Contact

Further information can be provided on request, or through involvement in public hearings in relation to this inquiry.

Points of contact are listed below:

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[4] https://dmtc.com.au/about/ceo-profile/