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Inquiry into the Department of Defence Annual Report 2021–22

The Australian National University Institute for Space (InSpace), thanks the Joint Standing Committee on Foreign Affairs, Defence and Trade for the opportunity to make a submission to its inquiry on the Department of Defence Annual Report 2021-2022.

InSpace connects ANU space research with society's biggest challenges, to deliver positive impact. We do this by shaping and growing the Australian space ecosystem in partnership with Industry, Government, and Communities. Our focus is to use space-based technologies to address challenges such as climate change, community resilience, health, sustainability, and defence which are aligned to many of the issues our government is committed to.

We note the understated role that space capabilities play in the Defence Annual Review. We also note the lack of clarity on the role of Defence Space Command. "Space" and "Space Command" receive a total of two pages of dedicated text in the Annual Review.

We see an opportunity for Defence Space Command to coordinate the ways in which space capabilities are already integrated across all armed services and in all domains; to grow a space trade within the armed forces; and to maximise regional and international cooperation on space capabilities and responsible behaviours in space, ensuring stability of the space domain.

Space based technologies enable nearly all operations in other domains. Much like cyber, Defence operations are impossible without space-based systems. Space is therefore both an enabling domain and a key operational domain. Space capabilities and space workforce should therefore be integrated across the entire Defence enterprise, and considered in all aspects of the forthcoming Defence Strategic Review and every annual report.

Key points:

(1) The criticality of space technologies to Defence outcomes is insufficiently understood, or insufficiently underscored.

The Annual Report notes that space is increasingly congested and contested (p 160). But it does not sufficiently highlight the criticality of space-based

technologies for all of Defence's operations, including our regional and global commitments. If this were clearer, it would become easier for Space Command to "advocate for space-specific priorities across whole-of government, industry, and our international partners in line with the rapidly changing strategic environment." (p 249)

Without the clarity that space systems are critical infrastructure, and that Defence simply cannot operate without access to space-based technologies, there is an uphill battle to get whole-of-government buy in, and a risk that Australia will miss out on key opportunities to influence the strategic environment.

For example:

Annual Performance Statement

Outcome 1. Conduct operations and national security support tasks which achieve Government-directed outcomes.

All operations in 2021-2022 that are analysed under the "Annual Performance Statement" were dependent on access to and use of space-based technologies. Asia-Pacific, Indo-Pacific and Global operations all rely on GPS navigation for land, naval and aviation operations; on satellite-based communications; and on Earth-observation for ISR. This should be highlighted.

One critical example is Operation TONGA ASSIST 2022. The immediate region had lost all undersea communication infrastructure. However, the University of the South Pacific in Tonga owns its own telecommunications satellite, which it uses to deliver university education across 12 islands in the region. Suddenly, this was the sole communication infrastructure available in a crisis situation. Defence should consider how it will deploy JP9102 capabilities in support of the region in the future.

Outcome 2. Defence maintains future-focused strategic policy to guide Defence initiatives and address strategic risks.

There is a need to have strategic policy that responds to the needs of the region, such as in the above example, and to geopolitical tensions playing out in the space domain. Contestation between China and the US is destabilising the space domain, however Australia should avoid adhering to a "Cold War 2.0" narrative that these two great powers will determine the future of space. There is an opportunity for Australia to take a strong middle power position, in collaboration with our Combined Space Operations partner nations, to ensure space remains accessible, stable and secure. The commitment to "future-focused strategic policy to guide initiatives and address strategic risks" (p 35) must therefore include well informed strategic space policies.

This means making explicit statements about how the 2020 Defence Strategic Update strategic objectives "shape, deter, defend" apply to space policies, capabilities and deployment.

- How will Defence "shape" the international rules based order applicable to space? The role of Defence, and in particular of Space Command, as an advocate for whole-of-government approaches is critical here. Australia has expressed a commitment to, and alignment with, the UN-led "responsible behaviours" agenda, and Defence already contributes to shaping these norms. The opportunity is to be more coordinated, more explicit, and to shape the behaviour of key space partners such as India, who remains ambivalent about the "responsible behaviours" agenda.
- How will Defence "deter" threatening activities to current and future sovereign space capabilities (including ground based infrastructure and space domain awareness), as well as to assets or systems on which we depend that belong to other nations? Answering this question requires significant investment through, for example, the Air and Space Power Centre.
- How will Defence "respond" to threats or interferences with sovereign and partner nation space capabilities? What does this mean when there are commercial services or capabilities implicated? What does this mean if there are cyber operations implicated? What cross-domain responses are possible to ensure the space domain does not become further threatened?

Outcome 3. Defence protects and advances Australia's interests globally to address current and future challenges.

Our dependence on space-based technologies for daily civilian life, and for all Defence operations, should be addressed as falling under current and future challenges. Since "Australia's strategic position is enhanced through international engagement by Defence", our collaborations with Combined Space Operations partner nations are critical. We therefore need better space literacy across all Defence personnel.

Indeed, this should be a key focus of Space Command, rather than being too driven by capabilities. The approach of UK Space Command and other partner nations can be followed more closely in this respect.

Outcome 5. Defence maintains intelligence analysis and capability to deliver Government and Defence strategic objectives.

A significant portion of intelligence comes from space-based capabilities, such as GEOINT. Australia already has key sovereign capabilities, including operators and analysts, and they should be included under the umbrella of Space Command.

Outcome 6. Defence designs the future force to address strategic risks.

"The Capability Program Architecture includes 35 capability programs aligned to five Domains (Maritime, Land, Air, Space, and Information and Cyber) and each of these domains has an assigned Capability Manager." But aside from capabilities, future workforce should focus on space literacy across all Defence trades, and a specific space trade should be developed, to allow for individual expertise to be harnessed, and to mitigate the strategic risk of diluting space operations and analysis knowledge.

Outcome 7. Defence anticipates and exploits advances in science and technology for future Defence capability.

One example is given of a small cyber security start-up that was supported and which now provides a novel cyber-security tool. Space capabilities and personnel with knowledge of strategic employment of these capabilities for ISR should be included in the same way.

Outcome 8. Defence's integrated capabilities, including workforce, are generated, trained and sustained to meet Government requirements.

There is a great need to better equip all Defence personnel with some basic understanding of the space domain, the criticality of space capabilities, and the political and technical threats to space systems. In much the same way that some basic training and education in cyberthreats and cyber operations is integrated in workforce training, and specialised career pathways are being created for ICT and cyber, so too should this be the case for space.

The commitment to diversity and inclusion (p 104) can contribute to solving the need for a Defence space workforce. This must go far beyond training modules, courses and portals, which are highlighted as the key focal points for diversity and inclusivity in the Annual Report. Many space careers are a subset of STEM careers, and we already know there is a global shortfall in STEM skills. As well there is a need for space analysts, space lawyers, space policy and strategy experts.

If Defence is to answer these needs, it needs to enlarge its existing commitment to creating a diverse and, moreover, inclusive workplace. Many space careers can be fulfilled by people with disabilities, and would benefit from the range of perspectives offered by a workforce made up of a range of genders, Indigenous and racially diverse Australians. As stated by The Hon Matt Keogh MP in the introductory pages of the Annual report: "Our people are the most important sovereign capability we have."

(2) The role of Space Command is unclear

It is stated that Space Command "will provide centralised coordination of all Defence space-related projects and capabilities." (p 158). This is too generic and unclear, given space related projects and capabilities are many and are integrated across all three of the armed services. It is unlikely that Space Command will coordinate Navy's use of GPS, or Army's GEOINT capabilities, or Air Force's use of PNT to deploy flights and weapons. It is also unnecessary.

Rather than being overly focused on capabilities, Space Command should ensure that it is contributing strategic and policy guidance to all three services, increasing general space literacy across Defence, and providing guidance on command decisions with respect to space systems. This is especially critical when it comes to protecting space systems, whether sovereign or those of partner nations on which Australia depends.

It is also critical when determining how to respond to threats by targeting space systems by non-kinetic means. The implications of the laws of armed conflict, or international humanitarian law, must be fully understood. This includes the application of the "women, peace and security" National Action Plan, and understanding the gendered impacts of both deploying and targeting space systems during conflict, and during disaster response or aid missions. The Australian Centre for Space Governance can provide assistance in understanding these implications and forming relevant policies.

There is an opportunity for Space Command to create some specific space careers or trades, while also supporting the three armed forces. This is similar to the way the cyber domain is understood to play an enabling and supporting role in all operations, and yet to have its own strategic importance and therefore a need for specific skillsets within Defence. Space Command need not compete with other services for command over space capabilities, rather it can provide space literate input into operations in the other domains, and ensure use of space systems for those operations is coordinated with our international partners, upon whom we depend for much of our space technologies.

It is also stated Space Command will be "the advocate for space-specific priorities across whole-of government, industry, and our international partners in line with the rapidly changing strategic environment" (p 249). There is a opportunity for Space Command to be much more proactive in this role, given the criticality of space technologies to our individual, national and regional security.

Space and ICT/cyber security should be more closely integrated. The greatest threats to any space system are cyber threats, and Defence personnel with the necessary training and skillsets to work in cyber operations are a great asset to space operations. In line with this, efforts to recruit into Cyber Operations Branch should include training and cross-postings into Space Command, and

vice-versa. The two capability areas need not compete with each other, rather they complement each other.

Space Command should also be better integrated with Defence Science and Technology, similar to the way Cyber Operations Branch is.

(3) Space activities, including the ground segment, should be included in the Defence Environmental Policy and Environmental Strategy 2016–2036

Environmental impacts on the congested environment in key strategic orbits, as well as environmental impacts of ground-based infrastructure for space systems, should be included in the Defence Environmental Policy and Environmental Strategy 2016–2036. This is in line with the focus of Operation DYURRA "to protect military and commercial assets against space debris [and] collisions" (p 160). It is also inline with the UN Guidelines for the Long-term Sustainability of Outer Space, and the commitment to ensuring space remains accessible, stable and secure.

InSpace and the Australian Centre for Space Governance would be delighted to assist the Committee's work further, including by giving expert evidence to any hearings.

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