



ENGINEERS
AUSTRALIA

Australian Space Agency
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Via [online submission form](#)

8 November 2024

Re: Australian sustainability of space activities: discussion paper

Thank you for providing Engineers Australia the opportunity to contribute to the sustainability of space activities in Australia.

Engineers Australia is the peak body of the engineering profession representing the collective voice of over 127,000 individual members. Constituted by Royal Charter, our mission is to advance the science and practice of engineering for the benefit of the community.

Engineers and engineering are central contributors to the development of Australia's sovereign space capability, and its associated impacts on national security and economic resilience. In the space sector, engineering work is embodied in virtually every good or service consumed, used or traded. Engineers also ensure that the benefits of Australia's space capabilities are realised by developing and deploying space technologies.

Engineers Australia is available to participate in future opportunities to discuss the issues raised in this submission. Please contact Daniel Salas – Policy & Projects Officer (dsalas@engineersaustralia.org.au) to continue the discussion.

Recommendations

1. Redefining sustainability to prioritise planetary and population wellbeing.

To achieve meaningful sustainability, policies should encompass planetary and population wellbeing, not solely the operation of spacecraft. Recent incidents of space debris re-entering Earth's atmosphere and impacting populated areas underscore the urgent risks to human life, infrastructure and environment. The long-term effects of excessive space debris and atmospheric pollution on overall planetary health are not fully understood. Thus, protecting the space environment must prioritise safety and wellbeing.

2. Stronger commitments to prevent future and remediate existing space debris.

Engineers Australia advocates for a stronger policy commitment to both prevent future space debris and address existing debris. Drawing on best practices from Europe, Japan, and New Zealand, Australia should implement debris-free guidelines for space projects and policies for active debris removal. Sustainability principles should also apply to the entire lifecycle of space missions, including ground infrastructure and launch processes, to address debris and pollution created during launch. These steps will bolster the resilience of Australia's space sector and contribute to a safer shared space environment.

To ensure space activities yield positive economic, social, and environmental outcomes, a space sustainability policy could establish mandatory best-practice standards that promote sustainable operation across the sector. Given the reliance on government funding, procurement practices could encourage sustainable space technology manufacturing. Recommended guidelines could include:

- Ensuring the Australian civil space object monitoring capability, if one is established, is provided the most accurate Space Situational Awareness data to monitor assets in orbit.
- National design criteria to minimise debris.
- Integration of sustainability throughout asset lifecycles.
- Application of circular economy principles for space technologies.

Extending these standards to ground infrastructure would further contribute to sector sustainability. By doing so, in addition to reducing risks associated with debris-re-entry, the space sector may reinforce public confidence by demonstrating a clear commitment to safety and environmental responsibility.

3. Investing in engineering skills needed to develop a sovereign, sustainable space capability.

Engineers Australia highlights a critical shortage of skilled space engineers and scientists, partly due to Australia's historical reliance on foreign space services.¹ Rapid expansion of the civil space industry has further stretched the limited talent pool.² From 2016 to 2021, demand for engineering skills across the economy exceeded supply, necessitating recruitment and retention strategies to meet sustainability and workforce goals.

To address the skills gap for engineering, including in the space sector, Engineers Australia recommends Government engage in the following:

- **Attracting new talent:** Promote STEM careers, provide resources to support teachers, and address misconceptions about engineering. Demand forecasting can help determine the future workforce needs.
- **Supporting skilled migration:** Adjust migration settings to recruit and retain skilled migrant engineers, who are crucial for filling space engineering roles; currently, only about 40% of skilled migrant engineers are employed in engineering roles.³
- **Building student opportunities:** Partner with industry and education providers to build pathways into space careers, incentivise relevant qualifications, subsidise masters degree places, and provide financial support to boost graduation rates. Only 8.5% of Australian graduates have an engineering qualification, ranking sixth-lowest in the OECD.
- **Improving retention:** Address structural factors causing engineering attrition and support career progression. Procurement incentives can encourage industry-led graduate programs and internships, while similar pathways within government agencies can help improve retention. Currently, only 56% of engineers are employed in engineering-related roles.
- **Promoting diversity and inclusion:** Increase opportunities for women and other underrepresented groups through scholarships, internships, and early STEM education. In 2022 women accounted for 14% of the engineering workforce.⁴

4. Establishing an Office of the Chief Engineer.

Engineers Australia supports establishing a Chief Engineer role within the Australian Government to provide strategic and technical advice on national system challenges such as the energy transition, infrastructure, transport and national resilience. Given the important whole-of-economy role that space plays, the Chief Engineer could provide advice to Government on the intersection of space with other critical systems, applying consistent sustainability principles across systems of systems. This office would

¹ Franzen, Moar, Dailey, NSCpE, [Space Policy Advice Paper](#) (2024) p.7

² Engineers Australia, [The Engineering Profession: A statistical overview](#) (2023) p.44

³ Engineers Australia: [Strengthening the engineering workforce in Australia](#) (2022) p.4

⁴ Engineers Australia: [Strengthening the engineering workforce in Australia](#) (2022) p.4

embed and enhance technical engineering expertise within the public service, bridging gaps between technical and policy areas.

While the position of Chief Scientist already exists, establishing a Chief Engineer to work alongside it would create a vital link between our national science and research capability, and the practical implementation and integration of national projects within Australia's dynamic economy and society. This partnership would strengthen the nation's ability to foster innovation and effectively advance national strategic goals, including for space.

In summary, Engineers Australia supports the proposed policy themes outlined in the consultation paper and considers that these themes need to be underpinned by stronger policy commitments and best-practice standards, and the development of practical guidance and frameworks. A further policy theme that considers skills and capabilities needed across the space sector to support sustainability should also be included.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jenny Mitchell', with a stylized, cursive script.

Jenny Mitchell

General Manager, Policy and Advocacy