Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The 2021 Roadmap used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

Q22.

Food and Beverage

Q23.
Medical Products

Q24.
Defence

Q25.
Recycling and Clean Energy

Q26.
Space

The global space sector’s economic value has doubled in less than 2 years to over half a trillion dollars in 2024 and this is only projected to increase largely through cheaper access to the space environment. However, this space “gold rush” has resulted on a growing concern that we are rapidly populating a precious low earth orbit environment with commercially driven solutions that include off the shelf components lacking sufficient qualification. Maturing industry’s electronic, materials, mechanical and satellite products through efficient access to space qualification accelerates their time to market. The Australian National University (ANU) has played a pivotal role in establishing and leading the National Space Qualification Network (NSQN), ensuring that Australia has a robust and coordinated approach to space qualification. With the vision to provide an efficient one stop shop approach to industry wanting to participate in the space economy, the NSQN has successfully integrated some of the nation’s most advanced research facilities, including the National Space Test Facility (NSTF), the Heavy Ion Accelerator Facility (HIAF), University of Wollongong (UOW), and Australian Nuclear Science and Technology Organisation’s (ANSTO) irradiation testing facilities, into a single, industry-facing framework. Since its establishment, NSQN has enabled a significant number of companies to conduct space qualification testing in Australia, reducing reliance on costly and time-consuming overseas facilities. Vibration and thermal research qualification has been provided by the NSTF supporting key industry players such as Fleet Space Technologies, Skykraft, and Space Machines Company, providing essential testing services including thermal vacuum, vibration, pyroshock, and atomic oxygen interaction tests. Similarly, HIAF has been instrumental in radiation effects testing, allowing organizations like CSIRO, RMIT, Curtin University, and various defense and aerospace companies to assess the resilience of materials and electronic components in space environments. ANSTO’s facilities have further contributed by enabling high-precision Total Ionizing Dose (TID) and Single Event Effects (SEE) testing, aligning Australian space payloads with international standards. Based on significant industry successes we request the NSQN is recognised in the national research infrastructure roadmap. Formal recognition of NSQN within the 2026 National Research Infrastructure (NRI) Roadmap is critical to ensure continued support and investment in space qualification. Recognizing it as a formal component of Australia’s national research infrastructure will cement its role as a key enabler of industry-led space research, testing, and commercialization, ensuring that Australia continues to compete at the forefront of the global space industry.

Q27.

Environment and Climate

Q28.

Frontier Technologies and Modern Manufacturing

Australia's growing space industry is a key example of frontier technology intersecting with advanced manufacturing, requiring highly specialized infrastructure to design, test, and launch reliable space systems. A critical bottleneck to innovation and commercial growth in this domain is the limited and fragmented access to space qualification infrastructure—the environmental and radiation testing required to ensure space-readiness of components and subsystems. The National Space Qualification Network (NSQN) addresses this gap by acting as a national, industry-facing framework that brings together space testing capabilities across institutions. NSQN simplifies and accelerates industry access to this infrastructure through a one-stop-shop model that coordinates scheduling, standards alignment, and technical support, significantly reducing the time and cost of qualifying space hardware in Australia. The model supports translation from R&D to market, directly advancing the competitiveness of Australia's frontier space technologies and defence-related innovation. Looking ahead, NSQN will be even more critical. With emerging trends such as reusable satellites, space-based manufacturing, radiation-hardened semiconductors, and AI-powered payloads, testing requirements are evolving rapidly. Current national infrastructure must be upgraded and expanded to meet international qualification standards (e.g., ECSS, NASA, JEDEC) and future mission demands. This includes investment in: • Larger vibration facility, the instrumentation needed to run EMI/EMC testing, a solar simulator for Wombat XL at the NSTF • High-energy ion beams (e.g., 100 MeV/nucleon) for advanced radiation testing at the HIAF • Additional laser module (fixed wavelength – 10-100 ps pulse width), and a microdecapping, trimming and micro-thinning facility for sample preparation to expand cutting edge laser testing capabilities at UOW Without sustained investment and national coordination, Australian companies will remain reliant on expensive overseas facilities, creating barriers to commercialisation and limiting our sovereign capabilities in space and related frontier domains.

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.
Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

Q31.

Supporting healthy and thriving communities

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Q33.

Protecting and restoring Australia's environment

Q34.

Building a secure and resilient nation

Future missions will require an advanced set of facilities that can simulate deep-space conditions and support cutting-edge research in materials science and sustainable space operations. The NSQN framework offers a proven model for coordinating these capabilities across different institutions, ensuring that emerging space research is well-supported by existing and new infrastructure. As the number of satellites and space assets in orbit continues to increase, sustainability in space has become a growing concern. There is an urgent need to develop technologies for sustainable space operations, including deorbit mechanisms, end-of-life satellite disposal, and spacecraft reusability. While many space agencies worldwide are investing in sustainable space technology, Australia can position itself as a leader in this domain by developing a national testbed for sustainable space technologies. NSQN has already demonstrated its ability to facilitate qualification for emerging space technologies, and expanding its role to include sustainability testing would further enhance its impact. Without a forward-thinking approach to expanding space research infrastructure, Australia risks being left behind in the rapidly evolving global space economy.

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.
If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

Proposal for Recognition of the National Space Qualification Network (NSQN) as a New National Research Infrastructure Capability Identified Need: Australia's space sector is entering a period of rapid growth, underpinned by frontier technologies in satellite design, space-based sensing, radiation-hardened semiconductors, and in-space servicing. However, one of the most significant and persistent gaps in the ecosystem is the lack of nationally coordinated, industry-accessible space qualification infrastructure. Testing and qualifying components for space—whether for launch, in-orbit operation, or reentry—is essential for ensuring mission success and reliability, but access to relevant infrastructure remains fragmented and underfunded. Currently, Australian companies often rely on overseas facilities to conduct some of environmental and most of radiation qualification, leading to increased cost, extended timeframes, and dependency on foreign infrastructure. This undermines sovereign capability, slows the translation of R&D into commercial outcomes, and limits Australia's competitiveness in the global space and semiconductor markets. Proposed Infrastructure Capability: We propose that the National Space Qualification Network (NSQN) be formally recognized and supported as a dedicated national research infrastructure platform. NSQN is an existing, functioning framework that integrates critical infrastructure nodes across the country, and is poised to become a one-stop-shop for space qualification services. NSQN also offers a research translation-focused operating model, actively bridging research infrastructure and industry needs. In doing so, it fills a critical gap in Australia's innovation system by lowering barriers to space hardware qualification and making national facilities accessible to SMEs, startups, and multinational companies alike. To meet emerging needs, this proposal also includes enhancements to existing infrastructure within NSQN, particularly: • Expansion of environmental testing capacity at the National Space Testing Facility, including Larger vibration facility, the instrumentation needed to run EMI/EMC testing, a solar simulator for Wombat XL. • Upgrades to the Heavy Ion Accelerator Facility (HIAF) to deliver 100 MeV/nucleon heavy ion beams, aligning with JEDEC and ECSS standards required for radiation qualification of advanced semiconductors. • Upgrades to laser testing facility at UOW to expand cutting edge laser testing capabilities to align with evolving new space ecosystem. • Cross-facility coordination tools to improve accessibility and service delivery. Impacted Research Communities: • Space and aerospace engineering researchers working on small satellites, propulsion systems, reentry systems, and in-orbit manufacturing • Semiconductor and microelectronics R&D teams developing radiation-tolerant or radiation-hardened components for LEO and deep-space use • Advanced materials scientists studying the impact of space environments on coatings, composites, and structures • National security and defence programs, where radiation-hardened, space-grade electronics are mission critical Call to Action: NSQN is an established, functioning, and highly impactful network that delivers on the intent of national research infrastructure: to enable world-class research and innovation, drive industry engagement, and support sovereign capability. It responds to a clearly identified and growing need, aligns with multiple national priorities (space, defence, semiconductors, advanced manufacturing), and is supported by research, government, and industry stakeholders. Recognizing NSQN in the 2026 NRI Roadmap—and investing in the necessary upgrades to its core facilities—will ensure that Australia can develop, test, and qualify frontier space technologies onshore, build global partnerships, and lead in emerging areas of advanced space and electronics manufacturing.

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the 2021 Roadmap related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

- ◯ Yes
- ◯ No

Q38.

3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

This question was not displayed to the respondent.

Q39.

3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

This question was not displayed to the respondent.

Q40.

3.4 If you answered no, please indicate your (one or more) primary reasons:

This question was not displayed to the respondent.

Q41.

Part 4: Other comments

4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.

The NSQN project has significantly improved the availability and coordination of space payload qualification in Australia through the establishment of a major multi-state space qualification infrastructure. The beneficiaries of the NSQN (NSTF) facilities include: • ANU for the Laser readout for Mass Change mission • CEA for L-band Filter and CEATEL units • DSTG for Buccaneer Main Mission and Radiation Payload engineering models, and space materials testing • EM Solutions for satellite transponder testing • Fleet Space Technologies for Centauri S, 6, 7, 8 satellite testing • Inovor for the Hyperion engineering model and in collaboration with Myriota/SmartSat CRC for the Kanyini satellite • Skykraft for various components testing including Block II Breadboard and Block IV battery insulation • Space Machines Company for the Optimus Light Transport platform • University of Melbourne for the SpIRIT satellite • University of Sydney for CUAVA-2 Payloads and Waratah Seed 1 satellite • University of Southern Queensland for SMPC samples testing Participants in the NSQN (HIAF) facilities include: • CSIRO for novel radiation shielding materials testing • Australian National University for radiation damage assessments on perovskite solar cells • RMIT for Dyneema degradation studies under proton irradiation • Curtin University/Binar for RadFET device proton response testing • Various groups in preliminary or discussion stages for device testing including DSTG, Aicraft, Infinity Avionics, Xaana, BAE Systems, ARM Hub, Swinburne University ofTechnology, FuturifAI, Price Forbes & Partners, Space Specialists, GDI Strategies, and Space Solar Users and visitors of the NSQN (ANSTO) NSW facilities encompass: • Advanced Navigation for TIO testing and MC simulation • Aerospace Overseas Primes in engagement with JP9102 • Airbus Defence and Space for facility visits • Blueprint Labs, CSIRO, Defence Science and Technology Government, and others for TIO gamma irradiation testing • Entities in discussion for various testing and simulation projects such as Cube pilot Pty Ltd, entX, Extra Terrestrial Power Industry, GPC electronics, Gilmour Space Technologies, Greatcell Australia Pty Ltd, Infinity Avionics, INVAP, MADLab (Macquarie University), NSW Space Research Network, Sperospace, Spiral Blue, Silanna Group, Steritech, Textron Systems Australia, Titomic, University of Sydney, University of Wollongong University, UNSW, and Zero Error Systems Industry for potential collaborations and use of facilities.