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

A strong resources sector needs to be at the technological forefront in order to be internationally competitive. This not only includes the major opportunities to develop critical minerals processing but to also invest in research and innovation that supports mapping towards new high-quality (e.g. Tier 1 and 2) resources discoveries that sustain our industry. Important here is the translation from new infrastructure technologies into pre-competitive geoscience (where Australian national and state/territory government geological surveys are world leaders), as well as the translation from regional pre-competitive geoscience into industry programs (which typical involves more detailed scales and aerial reduction).

Q22.

Food and Beverage

Q23.

Medical Products

Q24.

Defence

Q25.

Recycling and Clean Energy

The new Digital Atlas of Australia, launched in May 2024, is an emerging piece of critical digital national research infrastructure. The Digital Atlas brings together, curates and connects trusted national datasets from across government into an interactive, secure, and easy-to-use online platform for the community, industry, government and research sectors. The Digital Atlas allows anyone, anywhere to explore, analyse and visualise hundreds of datasets on Australia's geography, people, economy, and the environment by location in a central platform - empowering users with data to make place-based insights and decisions on many varied challenges. This is only the start of what is possible using the Digital Atlas. Through collaboration and partnership with data custodians, Geoscience Australia are continuously adding to and improving high value data, shared services, analytics, access and functionality of the Digital Atlas. Future integration of Machine Learning and AI technologies into the Digital Atlas will further reduce barriers to entry for non-technical users in government, industry and the community.

Q26.

Space

Landsat Next is an important mission towards building global half century Earth Observation data records. In 2024, through a Ministerial level Communique, Australia accepted the US Government's invitation to be a core partner in the next generation of its flagship satellite land imaging program, securing access to data critical to the nation's economic, environmental, and social decision making. The United States will provide free, streamlined, prioritised and open access to data from its current and future Landsat satellites including Landsat Next. This will enable Australians to use this data to support improved decision making, as well as unlocking new opportunities for science and innovation in areas such as climate change adaptation and improved agricultural productivity. Australia will provide essential satellite ground station support from an upgraded Alice Springs Ground Station capability; contribute capabilities in data processing, distribution, quality assurance and analytics including AI/ML techniques; and invest in new science to exploit the enhanced data to be generated by Landsat Next. The Positioning Australia program, through initiatives like the Satellite-Based Augmentation System (SBAS) known as SouthPAN and the National Positioning Infrastructure Capability (NPIC), have already demonstrated significant advancements in providing accurate and reliable positioning services across Australia. These services are crucial for various sectors, including agriculture, transportation, and emergency services, contributing to increased productivity, safety, and innovation. Looking ahead, Positioning Australia aims to support a resilient and innovative Positioning, Navigation, and Timing (PNT) ecosystem that delivers economic, social, and environmental benefits to all Australians. This includes enhanced PNT accessibility and reliability to provide accessible, robust, high-quality foundations for geodetic and location information, as accurate and reliable high-quality positioning information across Australia's land and sea; and resilient and innovative PNT ecosystems that support a resilient, innovative, Australian-led PNT ecosystem that delivers economic, social, and environmental benefits to all Australians. PNT infrastructure is critical for the resilience of other sectors, as identified by the United Nations and underpins many of the technological developments in other research themes and priority areas, but is not sustainably supported and presents hidden risks. Further investment in research infrastructure is necessary to identify alternatives and vulnerabilities in PNT systems. This will build on the foundational investment made through the Positioning Australia program and leverage the enhanced positioning, navigation and timing capabilities available.

Q27.

Environment and Climate

See Digital Atlas response above that also applies here. See below re the need for environmental prediction services for lands and coasts.

Q28.

Frontier Technologies and Modern Manufacturing

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

See response above on Digital Atlas as an emerging piece of critical digital national research infrastructure for Australia. See also "Resources Technology and Critical Minerals Processing" for how to sustain the resources requirements for this transition.

Q31.

Supporting healthy and thriving communities

See response above on Digital Atlas as an emerging piece of critical digital national research infrastructure for Australia.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

See response above on Digital Atlas as an emerging piece of critical digital national research infrastructure for Australia.

Q33.

Protecting and restoring Australia’s environment

See response above on Digital Atlas as an emerging piece of critical digital national research infrastructure for Australia.

Q34.

Building a secure and resilient nation

Expanded hazard monitoring infrastructure will be a requirement going forward. This is critical to meet the research outcomes of the research priorities Transitioning to a net zero future and Building a secure and resilient nation. The Australian seismic network should be expanded to allow effective measurement, monitoring, and verification (MMV) of baseline seismicity proximal to carbon capture and storage (CCS) projects. Passive seismic monitoring has also proven successful in monitoring ongoing CO2 containment and conformance to regulators’ requirements for these projects, in addition to mitigating the adverse impacts of induced seismicity. Other applications for additional seismic monitoring include the provision of fundamental data for the siting of nuclear waste storage and other nuclear facilities, improved characterisation of human-induced seismicity, and improved dam-safety assessments and to ensure the energy and water security of Australian communities. The data from expansion of the seismic network is multi-use and will increase our understanding of earthquake hazard in Australia, as well as improving our capacity to monitor and respond to the negative impacts of earthquakes in Australia. The growing availability of high-resolution data (scale of meters) describing Australia's built environment over spatially extensive regions is increasingly enabling hazard assessments to cover large areas in high detail. While this information is invaluable to support realistic risk mitigation measures, modelling at this scale continues to push the boundaries of computational feasibility, requiring continued increase in available computational resources as well as ongoing efforts to develop new techniques (e.g. using AI or other methods). The NCI is the current resource for this type of work and will need to be significantly expanded in the next 5-10 years to support this shift in hazard modelling. Positioning Navigation and Timing (PNT) systems are foundational to the resilience and technological advancement of various priority areas identified by the National Research Priorities, including disaster management, environmental sustainability, thriving communities, and national security. Future research in PNT will underpin the development of resilient infrastructure and the supporting digital systems, ensuring that Australia can effectively respond to and recover from disruptions. PNT infrastructure is integral to the resilience of other sectors, as highlighted by the United Nations, where it provides accurate and reliable data that supports critical operations across industries. By investing in research infrastructure for PNT applications, Australia’s national security can be enhanced, and also drive innovation and technological progress in key areas, ultimately building a secure and resilient nation. Further investment in research infrastructure is necessary to identify alternatives to, and vulnerabilities within existing PNT systems.

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.

Building on the outcomes of the NCRIS-supported scoping study, there is a clear need for NRI that supports environmental prediction and forecasting – particularly in relation to terrestrial and coastal ecosystems for which there is much less support than for oceanic and atmospheric domains. The ability for the research community to support Australia's adaptation to the impacts of climate change under a range of scenarios, including for key industries such as agriculture and financial services, is critical but will depend on integration of efforts and capabilities across climate, landscape science, social science, and economic modelling disciplines. This will require a major 'step up' from current approaches which focus on monitoring the current and past state of the environment, shifting to an approach where the best available climate forecasts are integrated with deep understanding of the likely/probably evolutions in landscapes and ecosystems. This will require national investment and coordination, including support for the development of new infrastructure such as new datasets, new digital ecosystem models, and greater integration of climate projection products with other datasets. A robust national 'Digital Twin' of our lands and coasts that is 'climate smart' would be a cornerstone element. Careful consideration should be given to how to leverage (and not duplicate) Australian Government operational capabilities (such as those provided by the Bureau of Meteorology and Geoscience Australia) and complement them with NRI-targeted funding that fills gaps and supports integration. Government, industry and private stakeholders are placing a greater reliance on Earth Observation data for a range of uses including environmental, commercial and defence. Each year, new remote sensors are launched by various international partners, which Australia benefits from through strategic partnerships, such as Landsat Next and the Copernicus Program. Funding a national data repository for science missions to complement the existing NCI hosted Copernicus Australasia Regional Data Hub and the future Indo-Pacific Data Hub would allow a greater focus on R&D missions and would allow for a greater number of datasets with greater data volumes to be exploited. The NRI-funded hub would ensure the datasets are analysis-ready, interoperable and accessible. Connecting the land and sea domains is integral to maintaining research capability where investment is required in the ground infrastructure (observing equipment), digital systems and architecture for data archiving and standardisation, as well as data dissemination. An example of this is the Coastal Research Infrastructure Initiative (yet to be funded).

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.

Q49.

4.2 Optional Document Attachment.
Note: Our strong preference is that answers are provided against the relevant questions in the survey. However, this file upload option is available for submissions in file format, where needed. Please ensure the document includes your name or organisation.