

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

Please note a full response to question 2.1 is included in the attachment

Q22.

Food and Beverage

Q23.
Medical Products

Q24.
Defence

Q25.
Recycling and Clean Energy

Q26.
Space

Q27.
Environment and Climate

- Climate Change and Biodiversity: Investing in technologies and infrastructures that accelerate our ability to monitor the impacts of climate change, biodiversity loss, biosecurity threats and pollution, at the speed and scale needed to inform decision makers. This will enable Australia's ability to navigate these threats, meet growing demands and maintain the natural systems that underpin our prosperity. These infrastructures support Australia's commitments to international frameworks like the UN Sustainable Development Goals and the Kunming-Montreal Global Biodiversity Framework.

Q28.
Frontier Technologies and Modern Manufacturing

• Integrative Structural Biology: Developing facilities that enable the study of structure-function relationships at multiple scales, from atomic to macroscopic. Investing in technologies that allow for detailed analysis of cellular and molecular structures is crucial because it drives advancements in health, energy, and environmental sciences. In health, these technologies enable early disease detection, accurate diagnosis, and the development of targeted therapies, significantly improving patient outcomes. In the energy sector, they facilitate the creation of more efficient energy storage systems and enhance catalytic processes, leading to more sustainable energy solutions. For environmental sciences, advanced imaging and analysis help monitor pollutants, understand climate change, and develop effective conservation strategies. • Advanced Imaging and Analysis: Investing in technologies that allow for detailed analysis of cellular and molecular structures, which are crucial for advancements in health, energy, and environmental sciences. Emerging research fields that require this capability include single-cell analysis, which is crucial for understanding cellular heterogeneity and advancing personalized medicine. CRISPR (clustered regularly interspaced Single Palindromic Repeats) and gene editing technologies rely on these capabilities to refine treatments for genetic disorders and other diseases. Biomolecular research uses advanced imaging to study the structure and function of biomolecules, aiding in the development of new therapies. Additionally, synthetic biology combines biology and engineering to design new biological systems, with detailed molecular analysis being essential for creating innovative biotechnological applications.

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

Please note a full response to question 2.2 is included in the attachment

Q31.

Supporting healthy and thriving communities

In a highly interconnected world, diseases can spread rapidly, both in humans and animals. For example, the H5N1 avian flu strain currently circulating within poultry and a range of other wildlife species is prompting concerns on biodiversity loss. To date, Australia and Oceania are the only places that the H5N1 avian flu has not reached. Surveillance to detect pathogens early is essential to stopping or minimising pathogen impacts to food supply and health in farm animals, wildlife, and humans. Key areas to consider: • Capabilities for the safe and secure analysis of biological specimens from around the world • Collection of surveillance data through novel diagnostic techniques and the large-scale analysis of big data.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Elevating Aboriginal and Torres Strait Islanders knowledge systems: CSIRO notes that many of the step changes within the 2021 NRI Roadmap offer the opportunity to elevate Aboriginal and Torres Strait Islanders knowledge systems, especially within Collections and digital research infrastructure.

Q33.

Protecting and restoring Australia's environment

Q34.

Building a secure and resilient nation

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.

Research infrastructure plays a critical role in scientific advancement, adapting new technologies, and delivering on Australia's science ambitions. National level investment for new capabilities, and enhancements to existing capabilities, will elevate Australia's research and development to be ready to tackle current and emerging scientific inquiries. Below are some capability gaps that could be supported to elevate the national research infrastructure. Enhanced capabilities: • Enhancing High Performance Compute (HPC) Capacity: CSIRO welcomes the aspiration in the Draft Recommended NDI Investment Plan to develop an integrated Australian HPC capability and notes that increased investment in this area is foreshadowed. • Artificial Intelligence (AI) and Machine Learning (ML): A digital infrastructure for hosting AI foundation models will attract new capability to Australia, leveraging on existing NRI investments in data access and compute, such as ACCESS-NRI, ARDC, and Pawsey. Data and Storage: CSIRO supports the 2021 NDI Roadmap's call for system-wide enhancements to data storage and networking infrastructure. • A dedicated radio transient monitoring array in the southern hemisphere: The Academy of Science Decadal Plan for Australian Astronomy (2016-2025) highlights an opportunity to amplify impact in the Square Kilometre Array (SKA) area, through small strategic investments. CSIRO welcomes the opportunity to discuss this with the NCRIS team. New capabilities: • Atmospheric Composition NRI: The Global Climate Observing system (GCOS) defines the Essential Climate Variables (ECVs) that are fundamental for national climate adaptation and mitigation planning. Currently, national research infrastructures deliver land ECVs via the Terrestrial Ecosystem Research Network (TERN) and for ocean ECVs via the Integrated Marine Observing System (IMOS). There is not currently an NCRIS facility that delivers ECVs for atmospheric composition. • Earth Observation (EO) Infrastructure: CSIRO affirms the need to support development of advanced Earth observation capabilities, as identified in the 2021 NRI Roadmap. Utilisation of earth observation data can be further applied to a broad range of science and research applications. CSIRO notes the emerging trend towards monitoring water quality. • National satellite data calibration and validation capabilities: Australia is internationally recognised for its satellite EO calibration and validation (cal/val) capabilities, spread across various organisations, including NCRIS facilities (e.g. TERN, IMOS, AuScope), government agencies (e.g. CSIRO, Geoscience Australia, Bureau of Meteorology) and universities. However, there is no central facility for accessing all cal/val datasets and expertise.

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:

- ☐ I did not know about it
- ☐ Other facilities suit my needs better
- ☐ I would like to, but cannot get access due to geographical location
- ☐ I would like to, but believed that access was only available to academic researchers
- ☐ I am not aware of any capability that meets my needs
- ☐ Other (please specify)

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.

CSIRO welcomes the opportunity to provide additional commentary relevant to the development of the 2026 NRI Roadmap below: The NCRIS program fills a crucial niche within Australia's research ecosystem. However, there is a notable gap in a structured program for landmark facilities. Addressing this gap is essential for the continued advancement of Australia's research capabilities. There is a need for a nationally integrated approach to infrastructure planning, investment, and mechanisms to support the lifecycle of research infrastructure across all sectors, delivering more impactful outcomes. Coordination and Collaboration: There is a need for better coordination and collaboration among different government investments in infrastructure. Currently, ARC, MRFF, NHMRC, NCRIS, DISR and PFRAs act quasi-independently on major infrastructure investments, upgrades, and funding for users. A coordinated approach is necessary to ensure funding is strategically geared towards the national science and research priorities. The Government (via NCRIS or otherwise) may be well positioned to provide the necessary coordination for landmark facilities that may not be adequately considered by other entities. This can complement discipline-specific coordination efforts, for example The Academy of Science Decadal Plan for Australian Astronomy (2016-2025). Dealing with Scale: Facilities that are becoming too large for the NCRIS program, such as the national capability in high performance computing (NCI and Pawsey), need a clear pathway to transition to landmark status. This requires a structured approach to managing the scale of these facilities. Landmark Facilities: Landmark facilities are typically large, highly specialised and have an expected operational lifetime of multiple decades and so require long-term planning and resources beyond the capacity of the NCRIS program to operate effectively. These facilities are often vehicles for collaboration with national and international partners at governmental scale. While landmark and NCRIS facilities share similar opportunities and challenges, they are particularly pronounced for facilities with long-term capital and operational investments such as the MNF and the ATNF, the Australian Synchrotron, etc. While the landmark facilities, although not materially supported by NCRIS, that must be included in any analysis of the research infrastructure landscape. Investing in research infrastructure is vital for amplifying our scientific, social, and economic impact. By strengthening the innovation ecosystem in Australia and globally, national research infrastructure enables researchers to tackle current and emerging challenges that ultimately deliver impacts to improve our society, health, and environment. It is through shared research infrastructure that Australia can support collaborative networks of researchers and users attracting strong national and international partnerships.

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.

[2026 NRI Roadmap Consultation - CSIRO Submission.pdf](#)

351.2KB

application/pdf