

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

N/A

Q22.

Food and Beverage

Emerging research directions amongst the AURIN community include the impact of climate change, energy transition and demographic transformation on urban food security and sustainable supply chains. Below are key research areas and their associated infrastructure needs: Emerging Research Direction: • AI-driven food supply chain optimisation to reduce waste. • Vertical farming for urban food security. • Blockchain and digital twins for end-to-end food traceability. Infrastructure Needs: • AI and Blockchain-Enabled Food Supply Chain Testbed: Infrastructure for optimising logistics, reducing waste, and ensuring food traceability. • Automated Vertical Farming Facility: A testbed for urban agriculture, LED-optimized plant growth, and AI-driven nutrient delivery. • Blockchain and Digital Traceability Innovation Hub: Infrastructure to develop and implement real-time food tracking systems.

Q23.

Medical Products

N/A

Q24.

Defence

N/A

Q25.

Recycling and Clean Energy

Emerging research directions amongst the AURIN community include net zero cities, energy transition in transport and circular supply chains. Below are key emerging directions and their associated critical infrastructure needs: Emerging Research Direction: • Hydrogen storage and novel energy carriers for grid stability and transport applications. • Floating and offshore wind energy technologies. • Integration of distributed energy resources (DERs) like rooftop solar, batteries, and EVs. • Blockchain-enabled peer-to-peer energy trading. Infrastructure Needs: • Hydrogen Refueling and Distribution Network Testbeds: Infrastructure for testing hydrogen transport, refueling stations, and fuel cell vehicle integration. • Offshore Renewable Energy Testbed: Infrastructure to support floating solar farms and offshore wind technology research in Australian waters. • National Smart Grid Testbed: A large-scale facility to trial real-time grid optimisation, virtual power plants, and DER integration under real-world conditions. • Cybersecurity and AI Lab for Energy Networks: Dedicated infrastructure to test grid resilience against cyber threats and optimise AI-driven energy management. • Vehicle-to-Grid (V2G) and Microgrid Innovation Centre: A research hub for testing how electric vehicles, batteries, and local energy systems interact with the national grid.

Q26.

Space

Emerging research directions amongst the AURIN community focus on higher resolution remote sensing, hyperspectral applications and safety of global positioning systems. Below are the key emerging directions and their associated infrastructure needs: Emerging Research Direction: • Advanced satellite systems for climate monitoring and disaster response. • AI-powered remote sensing for high resolution urban and infrastructure planning. Infrastructure Needs: • AI and Big Data Processing Hub for Earth Observation: A supercomputing and cloud-based analytics centre to manage and extract insights from vast satellite datasets. • Optical and Quantum Communication Ground Stations: Facilities to enhance secure and high-speed satellite communication

Q27.

Environment and Climate

Emerging research directions amongst the AURIN community include the impact of climate change on cities, regional centres, infrastructure and local communities. Below are key emerging directions and their associated critical infrastructure needs: Emerging Research Direction: • Understanding and predicting extreme climate events at finer spatial and temporal scales. • Developing models for climate adaptation strategies for cities and regional communities. • Modelling climate impacts on urban environments and infrastructure services. • Designing climate-resilient infrastructure and nature-based adaptation strategies. Critical Infrastructure Requirements: • High-performance computing (HPC) and AI-driven climate models with finer resolution for regional climate projections. • Advanced Earth observation systems, including new-generation satellites and drone-based remote sensing technologies, for real-time monitoring. • Next-generation carbon flux monitoring systems, including eddy covariance towers and automated soil carbon measurement technologies. • Urban Climate Testbeds: Smart cities equipped with high-resolution climate sensors, green infrastructure pilots, and urban heat monitoring.

Q28.

Frontier Technologies and Modern Manufacturing

Frontier technologies relevant to the AURIN community have been included in the above sections.

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

Emerging research directions amongst the AURIN community focus on major advancements in renewable energy, decarbonisation of transport, smart grids, and climate resilience. While Australia has made progress, critical research infrastructure is needed to scale up technologies, integrate solutions, and accelerate the transition. Below are the key research directions and associated infrastructure needs: Emerging Research Direction: • Scaling up circular economy manufacturing to reduce waste and emissions. • Expansion of vehicle-to-grid (V2G) technologies for integrated energy systems • AI-driven demand response and grid optimisation for renewable integration. • AI-powered climate modelling to predict and mitigate extreme weather impacts. Infrastructure Needs: • Integrated Transport and Energy Systems Lab: A testbed for V2G, smart charging, and low-carbon logistics solutions. • National Smart Grid Research Testbed: A large-scale real-world grid simulation for AI-driven energy management and V2G integration. • Climate Resilience Modelling and Data Hub: AI-enhanced infrastructure to improve climate risk forecasting and adaptation planning.

Q31.

Supporting healthy and thriving communities

Emerging research directions amongst the AURIN community include advancements in public health, environmental sustainability, and social well-being. While Australia has a strong foundation in health and community research, additional research infrastructure is needed to address emerging challenges such as ageing populations, mental health, climate-related health risks, and health inequities. Below are key research areas and their associated infrastructure needs: Emerging Research Direction: • Impact of urban design, social policies, and digital environments on well-being. • Climate change's impact on health (heat stress, air pollution, infectious disease). • Digital health solutions to improve access to healthcare in underserved communities. • healthy ageing, cognitive decline prevention, and age-friendly communities. Infrastructure Needs: • Social and Environmental Determinants of Health Lab: A research facility focused on urban planning, housing, and social infrastructure for mental well-being. • Climate and Health Research Supercomputing Hub: A facility for modelling climate-health interactions and informing policy. • National Air and Water Quality Monitoring Network: Expanded sensor networks and data platforms for real-time environmental health analysis. • Culturally Informed Healthcare AI and Data Platform: A secure and ethical data infrastructure for Indigenous health research. • Smart Ageing and Inclusive Communities Living Lab: A real-world test environment for age-friendly housing, transport, and digital inclusion.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

N/A

Q33.

Protecting and restoring Australia’s environment

N/A

Q34.

Building a secure and resilient nation

Emerging research directions amongst the AURIN community focus on disaster preparedness, critical infrastructure protection, and national supply chain resilience. While Australia has strong capabilities in these areas, emerging challenges, such as cyber threats, climate-related disasters, global instability, and biosecurity risks, necessitate additional research infrastructure. Below are key research areas and their associated infrastructure needs: Emerging Research Direction: • Secure and sovereign data infrastructure to prevent cyber espionage and hacking. • AI-driven real-time monitoring of utilities, transport, and communication networks. • Resilient supply chain and logistics management to natural and economic hazards. • Space-based Earth monitoring for climate, urban and resource management. Infrastructure Needs: • Sovereign Cloud and Secure Data Centre: A national facility to enhance secure data storage, processing, and digital sovereignty. • Climate and Extreme Weather Simulation Facility: A high-performance computing centre for climate-risk modelling and resilience planning. • Smart Grid and Resilient Energy Systems Lab: A research facility to enhance grid security, microgrid development, and renewable energy resilience. • Supply Chain Resilience and Advanced Logistics Hub: Infrastructure for modelling and securing supply chains against disruptions.

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.

Due to our mandate, AURIN's strategy and investment portfolio is informed by key Government and industry priorities on urban and infrastructure planning, as well as community well-being. Most recent and relevant documents include: The National Urban Policy (2024), released by DITRDCA The Sector Pathways Review (2024), released by CCA The National Health and Climate Policy (2023), released by DHAC The Critical Infrastructure Resilience Plan (2023), released by DHA The Strategic Plan 2020-25 (2022), released by the Infrastructure Sustainability Council The ALC Strategy 2023-25 (2023), released by the Australian Logistics Council Based on the above information, AURIN has made significant progress in leading two major National Research Infrastructure initiatives in collaboration with other NRI facilities, Government agencies and industry partners. These initiatives are: 1) The Australian Urban Climate Research Infrastructure (AUCRI) Establishing a crucial National Digital Research Infrastructure (NDRI) to inform evidence-based urban policies and interventions aimed at future proofing urban and infrastructure systems against climate change. AUCRI will position Australia as an international scientific leader in the field and optimise our investment in climate adaptation in Australian cities. AUCRI will federate five NCRIS facilities (AURIN, ACCESS-NRI, TERN, PHRN and ARDC), two ARC Centres of Excellence (Climate Extremes and Weather of the 21st Century) and two publicly funded research agencies (CSIRO and BoM). AUCRI will need to integrate Tier 1, Tier 2 and Cloud computing capabilities. AUCRI will address emerging research directions associated with Challenge #2, #5, #6 and #7, as well as NSRP #1, #2 and #5. In particular, AUCRI will address the following critical infrastructure needs: • High-performance computing (HPC) and AI-driven climate models with finer resolution for regional climate projections. • Advanced Earth observation systems, including new-generation satellites and drone-based remote sensing technologies, for real-time monitoring. • Next-generation carbon flux monitoring systems, including eddy covariance towers and automated soil carbon measurement technologies. • Urban Climate Testbeds: Smart cities equipped with high-resolution climate sensors, green infrastructure pilots, and urban heat monitoring. • Social and Environmental Determinants of Health Lab: A research facility focused on urban planning, housing, and social infrastructure for mental well-being. • Climate and Health Research Supercomputing Hub: A facility for modelling climate-health interactions and informing policy. • National Air and Water Quality Monitoring Network: Expanded sensor networks and data platforms for real-time environmental health analysis. 2) The Australian Urban Mobility Research Infrastructure (AUMRI) Establishing a crucial National Digital Research Infrastructure (NDRI) enabling Australia to become a global leader in automated and zero or low-emission transport, freight and logistics sector by harnessing emerging technologies at scale and harmonising data sharing between jurisdictions, as well as academic, public and private sectors. AUMRI will advance critical technologies such as artificial intelligence (AI) and robotics to allow us to transition to net zero in environmentally responsible ways. AURIN will partner with the National Transport Research Organisation (NTRO) to implement a network of Smart Mobility Living Labs (SMLLs), in partnership with public and private sectors, and a National Data Exchange (AUM-DX) that will act as long-term technology testbeds. AUMRI will contribute to relevant CRCs, such as RACE2030 or iMOVE. AUMRI will address emerging research directions associated with Challenge #2, #5, #6 and #7, as well as NSRP #1, #2 and #5. In particular, AUCRI will address the following critical infrastructure needs: • Vehicle-to-Grid (V2G) and Microgrid Innovation Centre: A research hub for testing how electric vehicles, batteries, and local energy systems interact with the national grid. • National Smart Grid Research Testbed: A large-scale real-world grid simulation for AI-driven energy management and V2G integration. • Smart Ageing and Inclusive Communities Living Lab: A real-world test environment for age-friendly housing, transport, and digital inclusion. • Sovereign Cloud and Secure Data Centre: A national facility to enhance secure data storage, processing, and digital sovereignty. • Supply Chain Resilience and Advanced Logistics Hub: Infrastructure for modelling and securing supply chains against disruptions.

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.

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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.

[NRI Roadmap 2026 - AURIN response - final.pdf](#)

116.2KB

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