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

Q27.
Environment and Climate

Q28.
Frontier Technologies and Modern Manufacturing

Gravitational wave detectors operate as a global network to which Australia contributes hardware, software and expertise at a world-leading level. This expertise is well-recognised amongst our peers working in these second generation gravitational wave observatories, e.g. LIGO (USA), VIRGO (Italy, EU), and KAGRA (Japan-asia). ANU Centre for Gravitational Astrophysics (CGA) and other institutions in OzGrav - the ARC Centre of Excellence for Gravitational wave Astronomy - (U Adelaide, UWA) have had a long and major contribution to LIGO - supplying cutting-edge technologies to enable the observations of gravitational waves. However Australia's contributions are made with funding which is unstable, and does not reflect Australia's impact on the world stage. The emerging technologies are highly aligned with Australia's technology priorities of quantum sensing, exquisite seismic signal detection, optical coatings for extremely low-loss optics as demanded by the world's gravitational wave observatories, but with applications to many other uses (defence, communications...) The critical requirement is for a new stable, NRI-level funding which supports this area of Australian capability to ensure Australia consolidates its position as a stable and top-tier partner in the global GW network. To this stage, Australia GW efforts have been funded by short term (3 year) ARC LIEF funding, significantly limiting our impact in the global environment as the funding is not at the sufficient scale. We are working in an environment with long-term funding and ambitions (e.g. USA LIGO and CE, and Europe VIRGO and ET). The field of GW physics is a truly cutting edge science which has hit its straps since the first detection of GWs as recognised by the support for OzGrav: however OzGrav cannot fund the R&D at scale and the supply of equipment & commissioning to the GW Observatories. Therefore GW technologies and the engagement with the global network must be included in the new Roadmap.

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

Gravitational wave technologies grow Australia's capabilities in exactly the technologies which Australia has identified to be a future secure and resilient nation: quantum sensing, precision measurements, optical coatings etc. The extreme demands of these observatories has a track record of nurturing spin-outs from the initial R&D.

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.

We are proposing that a new NRI Capability be targeted to gravitational wave physical system developments. The medium term goal is to secure and grow Australia's R&D and impact in the global network of GW Observatories, create more IP in the key areas as identified earlier. This discipline nurtures adaptable, skilled graduates who diffuse into industry and defence, and can be shown to be working in front line technology areas. This NRI capability needs to be secured from Jan 2026, for 10 years to allow Australia to cement its leadership and develop a potential case for larger participation in the global GW network.

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
- [x] Other (please specify) not industry

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.

This is a crucial time in the field of GW physics, with the development of a coordinated network through IGWN (International Gravitational Wave Network), and the planning for the next-generation Observatories, primarily driven by the USA NSF and Europe. Without secure, ongoing, roadmap-level investment Australia will not be able to contribute our leading technologies, and will fall behind in key areas (quantum sensing etc) which Australia has recognised are demanded for our nation's resilience.

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.