

Submission

2016 National Research Infrastructure Roadmap Capability Issues Paper

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Question 1: Are there other capability areas that should be considered?

Coverage is fine but be careful that infrastructure that contributes to more than one capability doesn't slip through the cracks. My favourite example is underpinning infrastructure for space assets which supports both remote sensing of the environment and various aspects of astronomy.

Question 2: Are these governance characteristics appropriate and are there other factors that should be considered for optimal governance for national research infrastructure.

Question 3: Should national research infrastructure investment assist with access to international facilities?

As written I think not. Support for that access should be governed by the research need it addresses. Support for international facilities is another matter altogether.

Question 4: What are the conditions or scenarios where access to international facilities should be prioritised over developing national facilities?

Question 5: Should research workforce skills be considered a research infrastructure issue?

This question almost answers itself. To be concrete, I suggest that increasing the skill-base for users is the most cost-effective enhancement we could make for several classes of infrastructure, e.g. high-performance computing.

Question 6: How can national research infrastructure assist in training and skills development?

I will respond to this and the following question together since I think the answer is partnership. The best solution is via intensive courses, ideally taken for credit as part of RHD courses. These would be offered by a consortium of the infrastructure and one or more institutes (presumably mainly universities). The "for credit" aspect isn't critical to get the ball rolling but I think it is necessary to get widespread student buy-in. A concomitant requirement is that infrastructure providers be required to quarantine funds for training.

Question 7: What responsibility should research institutions have in supporting the development of infrastructure ready researchers and technical specialists?

They retain the principal responsibility for giving students the background needed to learn to use the infrastructure but I don't think it's efficient to expect them, separately, to teach its use. Apart from efficiency, leaving this primarily in the hands of individual institutes promotes inequity since large and powerful institutes will have the capacity for this training but others may not.

Question 8: What principles should be applied for access to national research infrastructure, and are there situations when these should not apply?

First, criteria for access are probably different from those for support or development. I believe access to infrastructure is like access to any other form of research support like funding. Therefore the criteria should be those that pertain to the research and training agenda more widely. If criteria for different aspects of research support are misaligned then I think there's a problem.

Question 9: What should the criteria and funding arrangements for defunding or decommissioning look like?

Question 10: What financing models should the Government consider to support investment in national research infrastructure?

Question 11: When should capabilities be expected to address standard and accreditation requirements?

I can't list all cases but it's pretty clear that if an infrastructure is part of an international network then it must be shown to meet the required standards. It's surprising how often this is not necessary, e.g. deciding whether a given computer is big enough to deserve the name supercomputer is a waste of effort while ensuring that the Australian branch of a global measurement network is traceable to the global scale is worth meticulous attention.

Question 12: Are there international or global models that represent best practice for national research infrastructure that could be considered?

Question 13: In considering whole of life investment including decommissioning or defunding for national research infrastructure are there examples domestic or international that should be examined?

Question 14: Are there alternative financing options, including international models that the Government could consider to support investment in national research infrastructure?

Health and Medical Sciences

Question 15: Are the identified emerging directions and research infrastructure capabilities for Health and Medical Sciences right? Are there any missing or additional needed?

Question 16: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 17: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Health and Medical Sciences capability area?

Environment and Natural Resource Management

Question 18: Are the identified emerging directions and research infrastructure capabilities for Environment and Natural Resource Management right? Are there any missing or additional needed?

I don't think these are exactly missing but they're underplayed (probably for historical reasons) that mean they'll be easily forgotten. One is collecting (and making) observations of the built environment. Since entering this domain in the last few years I've been surprised how dispersed and variable this data is. AURIN helps and must be maintained and strengthened but making these observations at all is still a major task. The other element which should be strengthened generally concerns model-data integration. It's not a problem unique to Australia but gathering great environmental data with one hand and building great models with the other in the hope that researchers will do the considerable engineering to bridge the gap isn't very cost-effective.

Question 19: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

There are a lot of remote sensing activities Australia should support but perhaps more generally than these is thinking about coordinated approaches to regional calibration/validation of environmental remote sensing. There seem clear synergies in something like a Centre for Remote Sensing of the Southern Hemisphere. There is also the possibility of attracting geostationary assets into our region with, for example, support of the ground segment. Also, although I don't know of an overarching infrastructure it's clear that development of UAV-based measurement capability is a major new area. Centralizing the regulation, certification and integration of vehicles and instruments could produce a large overall saving compared to every institute doing this separately.

Question 20: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Environment and Natural Resource Management capability area?

Advanced Physics, Chemistry, Mathematics and Materials

Question 21: Are the identified emerging directions and research infrastructure capabilities for Advanced Physics, Chemistry, Mathematics and Materials right? Are there any missing or additional needed?

Question 22: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 23: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Advanced Physics, Chemistry, Mathematics and Materials capability area?

Understanding Cultures and Communities

Question 24: Are the identified emerging directions and research infrastructure capabilities for Understanding Cultures and Communities right? Are there any missing or additional needed?

Question 25: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 26: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Understanding Cultures and Communities capability area?

I would only add a plea for some coordination between this and the environmental area. Data discoverability gets you a fair way but coordination of data gathering across infrastructures could avoid some embarrassing gaps.

National Security

Question 27: Are the identified emerging directions and research infrastructure capabilities for National Security right? Are there any missing or additional needed?

Question 28: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 29: Is there anything else that needs to be included or considered in the 2016 Roadmap for the National Security capability area?

Underpinning Research Infrastructure

Question 30: Are the identified emerging directions and research infrastructure capabilities for Underpinning Research Infrastructure right? Are there any missing or additional needed?

This is a good list. I particularly endorse the emerging interest in geospatial data.

Question 31: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 32: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Underpinning Research Infrastructure capability area?

I think we need to keep broadening the range of HPC capability. Perhaps there should also be more thought about infrastructure to aid the public dissemination of research. Software infrastructure to facilitate public involvement (e.g. the weather-at-home projects) are both cost-effective and good for engagement.

Data for Research and Discoverability

Question 33 Are the identified emerging directions and research infrastructure capabilities for Data for Research and Discoverability right? Are there any missing or additional needed?

Question 34: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 35: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Data for Research and Discoverability capability area?

This is an area where the infrastructure's capabilities have far outstripped the research community's capability to use it. I'm afraid there's been a serious case of capture by the technologists. There's a pretty simple test here: If an educated researcher needs technical help for the curation and dissemination of her data then the infrastructure has failed. I get to watch repeats of this test every few days, CloudStor passes but nothing else does. CloudStor doesn't try to do much but it does its job well.

Other comments

If you believe that there are issues not addressed in this Issues Paper or the associated questions, please provide your comments under this heading noting the overall 20 page limit of submissions.

I am a totally blind researcher. I couldn't give an exhaustive catalogue but I fear most of the websites and related machinery attached to national research infrastructure would fail the universal accessibility requirements that obtain in many other countries. NCI is an honourable exception but others should make more reasonable attempts.