Submission

2016 National Research Infrastructure Roadmap Capability Issues Paper

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

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?

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?

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

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

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

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?

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?

Overall there needs to be an increased focus within NCRIS on understanding ecosystems and long-term biological processes. Ideally NCRIS facilities should support major initiatives such as the National Marine Science Plan 2015-2025. That plan has a range of key recommendations that relate strongly to NCRIS, including expanding IMOS resources into the nearshore and estuarine environments. One specific recommendation where I work closely is "Establish and support a National Marine Baselines and Long-term Monitoring Program, to develop a comprehensive assessment of our estate, and to help manage Commonwealth and State Marine Reserves". If we are to invest in any new areas it really should, in the marine space, be focussed in implementing these recommendations, rather than developing any grand new vision.

One core facility that I work with, is the IMOS AUV facility. This facility has allowed us to establish a truly national marine benthic monitoring program based on information on benthic cover of algae, invertebrates and fishes based on high quality imagery. This framework, guided by a new steering group, forms one central plank of the vision to establish an integrated national marine monitoring program. More planks will follow with NCRIS/IMOS/AODN support for appropriate framework and database development.

The AUV facility is both a central component of the NCRIS engagement in long-term biological monitoring, and one with significant scope to build innovation and link more closely with industry, particularly through standardised approaches to marine environmental monitoring and via the reduced costs and increased reliability that comes with automation. Autonomous systems are very much the future (and present) of marine monitoring programs and need NCRIS support to develop and innovate. Currently we only have one AUV in Australia (supported by NCRIS) capable of surveys to depths of around 300m. A replacement model is in development but needs additional support to be both ready to replace the existing AUV, and be a backup in case of loss. Similarly, support is needed to improve the capabilities of the autonomous platforms (improved image acquisition/resolution, multibeam sonar capability to assist in national mapping programs) to meet the nations requirements, particularly those now emerging for the new Commonwealth Marine Reserve estate, where habitat/ biodiversity inventory and monitoring programs are now urgently

required. As a cost indication, a replacement AUV like the current "Sirius" would cost around $400,000 and ideally Australia would have three of these available to the research community along with appropriate technical support.

A related need is the provision of database and data storage platforms and support to develop national facilities for an integrated marine monitoring program, including AUV and Baited Underwater Video programs. While IMOS/AODN have sufficient data holding facilities, resources are needed to develop appropriate database structures that meet the dada handling and reporting needs of both researchers and managers.

Finally, the current NCRIS facilities are poorly supported in many locations due to the lack of availability of research vessels appropriate to the task. While commonwealth support is given to the RV Investigator as a national facility, this is really a blue-water vessel that is not required for more coastally based projects, nor indeed is it available (due to very restricted sea-time vs requests for access), or cost effective. We are desperately lacking a small fleet in shelf-capable inshore vessels to support research cost-effectively in regional waters. While AIMS has Solander for example in NW Australia, and a similar vessel for the GBR, there is no equivalent in the SE or SW of Australia. From long practical experience in this space, I would strongly suggest that NCRIS assist in development of at least two new inshore vessels for these two regions. If kept at or below 24 m they can be managed very cost-effectively (two man crew). Anything above 25 m adds to expenses exponentially as at least a 4-man crew is required. A typical 24 m aluminium vessel that was setup for science (A-frame, science space, multibeam sonar etc) would cost around $4 million. Operating and maintenance costs would be around $2,000 per day if the crew was on standby as per AMC vessels. That would be around one third of current charter costs as well as allow a vessel to be set up appropriately for deployment of IMOS equipment such as the AUV, which most commercial charter vessels are not. Alternatively, in the short term, a vessel such as the AMC/UTas vessel Bluefin could be chartered at around 100 days seatime per year and made available to the science community with seatime made available via a steering committee as per the current arrangement for RV Investigator. A similar arrangement wold be made for any new inshore vessels, and ideally be a sub-component of the current Investigator committee.

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

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?

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?

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?

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?

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.