Submission

2016 National Research Infrastructure Roadmap
Capability Issues Paper

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Title/role	SAIL is based within the Sydney Institute for Astronomy (SIfA) at the School of Physics. SAIL is formed by laboratory spaces that are reconfigurable and equipped with the latest technology to support the design, fabrication, and testing of advanced astronomical instrumentation and astrophotonic concepts.
Organisation	University of Sydney

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

SAIL strongly endorses the possibility of a new Australian capability in **Advanced and Custom Optical Device Fabrication** through the NCRIS funding scheme.

The SAIL labs are world leaders in development of advanced photonic concepts for astronomical instrumentation ranging from compact photonic spectrographs to complex optical interferometry devices. Our technology exploits a variety of platforms including waveguide, fibre optics, and free-space optics as well as hybrid platforms.

A user-focussed service foundry for advanced and custom optical device fabrication and integration in Australia will yield an immediate boost to our productivity, providing a strong catalyst for our international research output. For example, the ability to prototype custom optics, especially for regions of the spectrum such as the mid-infrared (where custom optical components are extremely expensive and difficult to source) will have a profound impact on our research core areas in astronomical interferometry. Furthermore access to custom micro-optical components and quality Ion Sputtered complex optical coatings will critically shorten the development and testing cycle for the creation of new compact photonic spectrographs.

Seamless access to this type of foundry will not only enhance our research output, but also our impact on innovation and industry linkages. For example, it will allow rapid prototyping of applied optical instrumentation in collaboration with other research disciplines. For instance, SAIL labs has a vigorous collaboration with the agriculture private sector in the area of advanced photonics sensors in unmanned vehicles and aerial platforms. A wide-ranging foundry for optical device fabrication and integration will further allow these research-industrial links within our group by outsourcing many of the man power efforts on integration.

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?

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.

Email completed form to:

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