

Submission

2016 National Research Infrastructure Roadmap Capability Issues Paper

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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?

Response: This submission strongly supports the inclusion of geospatial systems as an explicit component of Underpinning Research Infrastructure capability for Australia. The contribution of geospatial systems to Australian society has in the past often been underestimated. But the contribution of geospatial systems is now widely acknowledged to be growing, and already to represent billions of dollars annually in productivity gains to national GDP. Australia's world-leading position in geospatial systems capability today supports many vital government and industry activities, including in other key capability areas such as Health and Medical Science and Environment and Natural Resource Management.

As identified in the report, these underpinning geospatial system capabilities include positioning (e.g., National Positioning Infrastructure), remotely-sensed Earth observation data, and support for national access to such data (e.g., Australian Data Cube). However, this submission highlights further important linkages between the underpinning geospatial systems capabilities and two other fundamental capabilities: Environment and Natural Resource Management and Data for Research and Discoverability.

- *Continuous monitoring by sensor networks:* This submission notes the importance of continuously monitored and automated sensor observations in connection with the future Environment and Natural Resource Management capability. Our national geospatial systems capability also underpins the infrastructure of such automated sensor systems. Networks of sensors in the built and natural environment are increasingly used as a "macroscope" to drive a diversity of research activity. Our future geospatial systems capability must support on these scientists, government, and industry who increasingly rely on being able to access streaming and real-time data from sensor networks embedded in the environment. This capability should include both the selection, establishment, and maintenance of automated sensing at key locations, as well as the information infrastructure of accessing, retasking, and deploying real-time data from such sensor networks.
- *Geospatial system of systems:* The report highlights the importance of accurate, timely, and available spatial data for industry, government, and research as a key characteristic of

Underpinning Research Infrastructure. The report also identifies the need for support for analysis, collaboration scientific, and “virtual laboratories” as a vital component of Data for Research and Discoverability. Our national geospatial systems capability needs to connect these two capabilities, connecting data to analytics, and supporting a “system of systems” approach to geospatial data sources and geospatial analytics. The National Research Infrastructure should enable shared and collaborative analysis and decision making with spatial (and non-spatial) data. Ensuring our eResearch infrastructure fully supports virtual laboratories of scientists, government, and industry requires not only to support access the latest spatial data. It also requires support for collaborative processing, integration, and analysis of this data; combining diverse data sources from national mapping to sensor data; and supporting the summation and presentation of that data in a form accessible to domain experts as well as decision-makers and stakeholders. These too are all fundamental functions of our national Geospatial Systems Research Infrastructure Capability.