

CAPABILITY SCOPING DOCUMENT

(Summarising capabilities proposed for the Strategic Roadmap of Australia's research infrastructure needs)

Proposed Capability (Systemic infrastructure)	National Research Priorities and associated priority goals	Relevant processes, policies or programmes	Suggested implementation options	Relevant Submissions
<p>Accessible, robust high bandwidth communication network for research and education</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ information and data management related to the National Data Network for marine science 	All	<p>Work of the Broadband Advisory Group and Higher Education Information Infrastructure Advisory Committee (HEBAC)</p> <p>e-Research Coordinating Committee</p> <p>Work of the Australian Academic Research Network (AARNET)</p>	<ul style="list-style-type: none"> ▪ Extension of the Australian Research and Education Network (AREN) ▪ AREN International connectivity: <ul style="list-style-type: none"> ▪ SXTransPORT post 2009 ▪ Asian links ▪ Extension of GrangeNet ▪ Extension of CeNTIE to support research infrastructure projects, including a broadband communications facility supporting development and testing of fibre and wireless communication technologies 	<ul style="list-style-type: none"> ▪ CSIRO ICT Centre (informal) ▪ Supported by a number of submissions
<p>Distributed high performance computing capacity</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ provision of high performance computing for e-Research ▪ state based HPC networks 	All	<p>Work of the Higher Education Information Infrastructure Advisory Committee</p> <p>e-Research Coordinating Committee</p> <p>National High Performance Computing and Communications Program</p>	<ul style="list-style-type: none"> ▪ Stage 3 of Australian Partnership for Advanced Computing (APAC) (from around 2009) 	<ul style="list-style-type: none"> ▪ Australian Partnership for Advanced Computing (50) ▪ Supported by a number of submissions ▪ Qld Gov (67)
<p>Accessible data and information repositories</p> <ul style="list-style-type: none"> ▪ Support sustainability and continuity of digital collections ▪ Improved data mining and 	All	<p>e-Research Coordinating Committee</p> <p>Accessibility Framework for publicly funded research.</p>	<ul style="list-style-type: none"> ▪ Extension of Australian Partnership for Sustainable Repositories (APSR) ▪ Extension of Australian Research Repositories Online 	<ul style="list-style-type: none"> ▪ National Library of Australia (39) ▪ CAUL (47) ▪ CAUDIT (46) ▪ Premiers Science

<ul style="list-style-type: none"> visualization tools ▪ Digitisation of records 		<p>Work of the Higher Education Information Infrastructure Advisory Committee and ARIIC</p>	<ul style="list-style-type: none"> to the World (ARROW) ▪ Australian Digital Theses Programme (ADT) ▪ Meta Access Management Systems Project (MAMS) ▪ APAC Mass Storage 	<p>and Research Council (SA) (27)</p> <ul style="list-style-type: none"> ▪ Supported by a number of submissions
<p>Accessible research instruments and facilities</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ library access and charging ▪ telemedicine ▪ multipurpose analytical science facilities 	All	<p>e-Research Coordinating Committee</p> <p>Accessibility Framework for publicly funded research.</p> <p>Framework for the Future Steering Committee</p>	<ul style="list-style-type: none"> ▪ To be identified as part of the Accessibility Framework developed by the e-Research Coordinating Committee ▪ Multipurpose analytical sciences facility for the Northern Territory 	<ul style="list-style-type: none"> ▪ NT Government (23) ▪ Qld Gov (67)
<p>Agreed ICT standards and coordinated middleware development</p>	<p>All</p> <ul style="list-style-type: none"> ▪ Safeguarding Australia – access protocols to appropriate identities 		<ul style="list-style-type: none"> ▪ Meta Access Management Systems Project (MAMS) ▪ Co-operation Framework between DEST and Joint Information Systems Committee (JISC) (UK) ▪ Co-operation between DEST and Advanced Distributed Learning Initiative (sponsored by US Department of Defence) ▪ Ongoing work of IMS in Australia ▪ Interoperability Development Events Australia (IDEA) ▪ Middleware fora 	<ul style="list-style-type: none"> ▪ CAUDIT (46) ▪ CSIRO ARRC (17)
<p>Standardised measurement systems</p>	All		N/A	<ul style="list-style-type: none"> ▪ DITR (61)
<p><u>International</u></p>				
<p>Australian participation in international collaborative e-research activities and access to collaborative partners' networks, facilities/instruments and repositories, to support activities under NRPs.</p>	All		<p>Collaborative undertakings/agreements with overseas partner organisations such as JISC, NSF, Internet2, Europe (EGEE Enabling Grid E-Science)</p>	

Proposed capability (by primary National Research Priority (NRP))	National Research Priorities and associated priority goals	Relevant processes, policies or programmes	Suggested implementation options	Relevant Submissions
An Environmentally Sustainable Australia				
<p>Improved systems for environmental monitoring</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ land, water and biosphere monitoring and observing ▪ monitoring environmental responses to climate change ▪ environmental data repository/ies ▪ marine ecosystems <p><i>For solid earth monitoring see 'geophysical structures' below.</i></p>	<p>An Environmentally Sustainable Australia:</p> <ul style="list-style-type: none"> ▪ Water a critical resource ▪ Responding to climate change and variability ▪ Overcoming soil loss, salinity and acidity ▪ Sustainable use of Australia's biodiversity <p>Promoting and Maintaining Good Health</p> <p>Safeguarding Australia</p>	<p>Australian Climate Change Science Programme</p>	<ul style="list-style-type: none"> ▪ Integrated national terrestrial observing program and data repository ▪ Upgrading of the existing OzFlux network for biosphere monitoring ▪ Network of flux towers to monitor terrestrial carbon cycling ▪ Enhanced capabilities related to data and modelling of climate systems ▪ Free Air CO2 Enrichment Facility ▪ Centre for the Study of Environmental responses to climate change ▪ Integrated national ocean observing system (AusIOOS) with blue-water and coastal components including an Argo float network for southern ocean ▪ Environmental monitoring and rehabilitation technologies to protect tropical river systems ▪ Centre for ecosystem sustainability research ▪ Water resources observation network (WRON) to provide a national data resource for water resource management 	<ul style="list-style-type: none"> ▪ University of Western Sydney (11) ▪ Australian Greenhouse Office (63) ▪ Monash (57) ▪ James Cook University (8) ▪ NT Government/ Charles Darwin University (23) ▪ SA DFEEST (20) ▪ CSIRO (informal) ▪ Qld Gov (67) ▪ CHABG (30) ▪ ARC Earth System Science Network (31) ▪ Australian Marine Sciences Association (56)

<p>Enhanced capability for tropical science and technology</p> <p>Including capability related to:</p> <ul style="list-style-type: none"> ▪ tropical marine research including the Great Barrier Reef ▪ rehabilitation of tropical ground and surface water systems ▪ tropical agriculture <p>See also ‘environmental monitoring’ above</p>	<p>An Environmentally Sustainable Australia</p> <ul style="list-style-type: none"> ▪ Sustainable use of Australia’s biodiversity ▪ Water – a critical resource <p>Promoting and Maintaining Good Health</p> <p>Safeguarding Australia</p>	<p>Rural R&D Committee priority:</p> <ul style="list-style-type: none"> ▪ Sustainable natural resource management <p>NT Government priority</p> <p>2001 Review of Marine Research in Tropical Australia (CS)</p> <p><i>Environmental Protection and Biodiversity Conservation Act 1999</i></p> <p>Cooperative Framework in Tropical Science, Knowledge and Innovation (Qld, NT, WA)</p>	<ul style="list-style-type: none"> ▪ ‘Tropical Marine Network’ – upgrade existing network of GBR research stations including Lizard Island Research Station ▪ Tropical science and innovation precinct at James Cook University, Townsville ▪ Wet tropics Rainforest Oz Flux facility ▪ Expansion of Arafura Timor Research Facility 	<ul style="list-style-type: none"> ▪ Australian Museum (1) ▪ Lizard Island Reef Research Foundation (6) ▪ James Cook University (8) ▪ NT Government/ Charles Darwin University (23)
<p>Enhanced capability for marine science within Australia’s exclusive economic zone</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ shore based and ocean going capacity to research marine ecology and geology ▪ research into sustainable fisheries 	<p>An Environmentally Sustainable Australia</p> <ul style="list-style-type: none"> ▪ Sustainable use of Australia’s biodiversity <p>Promoting and Maintaining Good Health</p> <p>Safeguarding Australia</p>	<p>Australia’s Marine Science and Technology Plan</p> <p>Three-year Strategic Marine Science Priorities (OPSAG)</p> <p>Australia’s Ocean Policy</p> <p>United Nations Convention on the Law of the Sea</p> <p>National Strategic Plan for the Geosciences (2003)</p>	<ul style="list-style-type: none"> ▪ Upgrade of Arafura Timor Research Facility to study marine and coastal ecosystems of the Arafura Timor region ▪ Deep and shallow water vessels with surveying equipment ▪ Ocean and coast Observing Systems (AusIOOS) (see also ‘environmental monitoring’ above) 	<ul style="list-style-type: none"> ▪ NT Government/ Charles Darwin University (23) ▪ Australian Marine Sciences Association (56) ▪ Geoscience Australia (40) ▪ DITR (61) ▪ MARGO (14) ▪ Australian National Seismic Imaging Resource (2) ▪ University of Tasmania (37) ▪ CSIRO (informal)
<p>Data and collections to record and preserve Australia’s biodiversity (including marine biodiversity)</p> <p>Including:</p>	<p>An Environmentally Sustainable Australia</p> <ul style="list-style-type: none"> • Sustainable use of Australia’s biodiversity • Transforming existing 		<ul style="list-style-type: none"> ▪ National biodiversity focussed genomics facility ▪ Genome sequencing fund ▪ Biosensors for monitoring quality and generation of 	<ul style="list-style-type: none"> ▪ Australian Museum (1) ▪ Botanic Gardens Trust (3) ▪ Council of Heads

<ul style="list-style-type: none"> ▪ cataloguing of Australian native species (flora and fauna). ▪ mapping biodiversity (esp. key species) using genomic and proteomic techniques ▪ developing genomic sequences for key species ▪ databases and repositories to record and access information on Australia's biodiversity (including exotic species) ▪ expertise and tools to develop and maintain biodiversity collections ▪ seedbanks 	<p style="text-align: center;">industries</p> <p>Promoting and Maintaining Good Health</p> <p>Frontier Technologies</p> <p>Safeguarding Australia</p>		<p>genome sequences for species requiring active management</p> <ul style="list-style-type: none"> ▪ Complete and maintain databases linking biodiversity collections held in Australia's herbaria, museums, botanic gardens, CSIRO and other related collections, including the 'Australian Virtual Herbarium', and 'Online Zoological Collections of Australian Museums' ▪ National Seedbanking initiative (linked to international initiatives) ▪ National Centre for Mycology ▪ Virtual Australian National Insect Collection – linking key entomological collections ▪ Plant Functional Facility 	<p>of Australasian Herbaria (19)</p> <ul style="list-style-type: none"> ▪ Council of Australian Museum Directors (21) ▪ NT Gov/Charles Darwin University (23) ▪ Australian Genome Alliance (26) ▪ Australian Genome Research Facility (35) ▪ CSIRO/ANU (informal) ▪ Geoscience Australia (40) ▪ CHABG (30) ▪ CSIRO/ANU (informal) ▪ Qld Gov (67)
<p>Data on Australia's geophysical structures</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ improved geophysical imaging technology; ▪ data on crustal architecture and the continental shelf ▪ database/s and repositories to record and access information on Australia's geo-diversity 	<p>An Environmentally Sustainable Australia</p> <ul style="list-style-type: none"> ▪ Developing deep earth resources 	<p>National Strategic Plan for the Geosciences (2003)</p>	<ul style="list-style-type: none"> • Geotransects of the Australian Plate • Network of ocean bottom seismometers • Curtin Minerals and Chemistry Research Precinct • Full databasing and linking of the geodiversity collections in Australian museums ▪ 'Grid' enabled earth systems informatics network 	<ul style="list-style-type: none"> ▪ Australian National Seismic Imaging Resource MNRF (2) ▪ Dr B Drummond (25) ▪ Geoscience Australia (40) ▪ Curtin Uni (32) ▪ DITR (61)
<p>Infrastructure to develop improved technologies for the treatment and management of water</p>	<p>An Environmentally Sustainable Australia:</p> <ul style="list-style-type: none"> ▪ Water a critical resource ▪ Overcoming soil loss, 			<ul style="list-style-type: none"> ▪ NSW Government (68)

	salinity and acidity			
Agriculture, horticulture and animal health		Rural R&D Committee priorities		<ul style="list-style-type: none"> ▪ Qld Gov (67) ▪ NSW Government (68)
Coal and biomass gasification technologies	An Environmentally Sustainable Australia <ul style="list-style-type: none"> ▪ Reducing and capturing emissions in transport and energy generation ▪ Transforming existing industries 	2004 Energy Statement - Energy Technology Assessments process	<ul style="list-style-type: none"> ▪ National Low Emissions Gasification Research and Test Facility 	<ul style="list-style-type: none"> ▪ CSIRO (informal)
Alternative energy technologies	An Environmentally Sustainable Australia <ul style="list-style-type: none"> ▪ Reducing and capturing emissions in transport and energy generation ▪ Transforming existing industries 	2004 Energy Statement - Energy Technology Assessments process	<ul style="list-style-type: none"> ▪ National facility for research into new materials for renewable energy 	<ul style="list-style-type: none"> ▪ Monash Uni (57) ▪ Queensland Government (67) ▪ CSIRO (informal)
Environmental recovery data and technologies Including: <ul style="list-style-type: none"> ▪ Tropical river systems ▪ Land rehabilitation related to mining 	An Environmentally Sustainable Australia <ul style="list-style-type: none"> ▪ Sustainable use of Australia's biodiversity 	Rural R&D Priorities	<ul style="list-style-type: none"> ▪ Environmental restoration research facility 	<ul style="list-style-type: none"> ▪ Botanic Gardens Trust (3) ▪ SA DFEEST (20) ▪ NT Government/ Charles Darwin University (23) ▪ Council of heads of Australian Botanic Gardens (30)
Geospatial information	An Environmentally Sustainable Australia	National Strategic Plan for the Geosciences (2003)	<ul style="list-style-type: none"> ▪ Global Spatial Data Infrastructure ▪ Australian National Seismic Imaging Resource 	<ul style="list-style-type: none"> ▪ DITR (61) ▪ ANU (51) ▪ CSIRO ARRC (17)
<u>International</u>				
International biodiversity initiatives	An Environmentally Sustainable Australia <ul style="list-style-type: none"> ▪ Sustainable use of Australia's biodiversity 		<ul style="list-style-type: none"> ▪ Linking of domestic biodiversity related databases would provide for Australia's full participation in the Global Biodiversity Information 	<ul style="list-style-type: none"> ▪ NT Gov/Charles Darwin University (23)

			<ul style="list-style-type: none"> ▪ Facility. ▪ Participation in international Seedbank initiatives 	
International ocean drilling	<p>An Environmentally Sustainable Australia</p> <ul style="list-style-type: none"> ▪ Developing deep earth resources <p>Safeguarding Australia</p> <ul style="list-style-type: none"> ▪ Critical infrastructure 	National Strategic Plan for the Geosciences 2003	<ul style="list-style-type: none"> ▪ Australian participation in Integrated Ocean Drilling Programme (IODP) 	<ul style="list-style-type: none"> ▪ MARGO (14)
Participation in international climate, water and land monitoring initiatives and networks	<p>An Environmentally Sustainable Australia</p> <ul style="list-style-type: none"> ▪ Responding to climate change and variability ▪ Water - a critical resource ▪ Overcoming soil loss, salinity and acidity 		<ul style="list-style-type: none"> ▪ Australian participation in the Global Earth Observation System 	<ul style="list-style-type: none"> ▪ CHAH (19) ▪ Council Heads of Australian Botanic Gardens (30) ▪ Earth System Science Network (31) ▪ Australian Proteome Analysis Facility (7)

Proposed Capability (by primary associated National Research Priority (NRP))	National Research Priorities and associated priority goals	Relevant processes, policies or programmes	Suggested implementation options	Relevant Submissions
Promoting and Maintaining Good Health				
<p>Infrastructure for genomic, proteomic and phenomic research.</p> <p>Specific capabilities proposed relate to:</p> <ul style="list-style-type: none"> • obtaining genomic sequences of important species; • development of new bioscience technologies; • genomic aspects of neuroscience; • connecting genome sequences with infectious and immunological disease mechanisms • interface between proteomic and human genetics research capabilities; • bioinformatics (see also below) <p><i>Cross reference to proposed capability in relation to plant and animal genomics etc under 'An Environmentally Sustainable Australia' above</i></p>	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively ▪ Preventative healthcare. <p>An Environmentally Sustainable Australia</p> <p>Frontier technologies</p> <p>Safeguarding Australia (biosecurity aspects of this proposed capability are addressed further below)</p>	<p>Biotechnology Strategy – esp. National Biotechnology Research Cooperation</p>	<ul style="list-style-type: none"> ▪ Biomarker discovery facility ▪ Genomic sequencing fund – to facilitate sequencing of a number of key genomes ▪ Brain Genome Research Facility (GSF agenda item) ▪ Metabolomic facility (also related to biosecurity – see below) <p>Upgrade of existing major national facilities.</p>	<ul style="list-style-type: none"> ▪ Australian Proteome Analysis Facility (7) ▪ National Neuroscience Facility (10) ▪ Australian Genome Alliance (26) ▪ Uni of Tasmania (37) ▪ Ludwig Institute (58) ▪ Australian Genome Research Facility (45) ▪ Queensland Gov (67) ▪ AAS (52) ▪ CHAH (19) ▪ Council of Australian Museum Directors (21)
<p>Medical imaging capability for non-clinical research applications</p> <ul style="list-style-type: none"> ▪ Including high field MRI technology 	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare. 		<ul style="list-style-type: none"> ▪ High field MRI at new UWS medical school ▪ Magnetic Resonance Imaging (MRI), Functional Magnetic Resonance Imaging (fMRI) and Positron emission 	<ul style="list-style-type: none"> ▪ UWS (11) ▪ National Neuroscience Facility (10) ▪ Bio21 (9)

	<p>Frontier technologies for building and transforming Australian Industries</p> <ul style="list-style-type: none"> ▪ Breakthrough science ▪ Frontier technologies 		tomography (PET)	
NMR spectroscopy facilities	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare <p>An Environmentally Sustainable Australia</p>		<ul style="list-style-type: none"> ▪ 1 GHz nuclear magnetic resonance (NMR) spectroscopy facility, networked with other existing high field facilities 	<ul style="list-style-type: none"> ▪ AAS (52)
Biomedical and biotechnology relevant beamline instruments for Australian Synchrotron	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare. <p>Frontier Technologies for Building and Transforming Australian Industries</p>		<ul style="list-style-type: none"> ▪ Establishment of relevant synchrotron beamlines and associated access and equipment for biomedical research 	<ul style="list-style-type: none"> ▪ Ludwig Institute (38) ▪ Bio21 (9)
<p>Infrastructure to support the study of animal models of disease</p> <ul style="list-style-type: none"> ▪ animal holding, breeding, surgery facilities ▪ xenotransplantation facilities ▪ animal phenotyping facilities ▪ archive and distribution networks to provide access to gene knockout animals and transgenic or mutant animals <p>Also see <i>Mouse 'knock out' library</i> under International</p>	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare <p>Frontier Technologies for Building and Transforming Australian Industries</p>		<ul style="list-style-type: none"> ▪ Genetic variant rodent strain database and network of facilities to produce and distribute specimens ▪ Animal Oncology and Reproductive facility ▪ Whole mouse phenotyping facility ▪ Mutant Animal Archive 	<ul style="list-style-type: none"> ▪ Australian Phenomics Facility (4) ▪ Bio21 (9) ▪ SA PSRC (27) ▪ CSIRO/Uni of Sydney (22) ▪ Australian Phenomics Facility (4) ▪ Bio21 (9) ▪ Ludwig Institute (38) ▪ NHMRC (70)

Nationally coordinated tissue banks (disease/organ specific linked to e-health records and research data)	Promoting and Maintaining Good Health: <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare. 		<ul style="list-style-type: none"> ▪ National coordination of tissue banks with disease/organ specific specimens linked to records and data 	<ul style="list-style-type: none"> ▪ Bio21 (9) ▪ PSRC SA (27)
Development of infrastructure for neuroscience and cognitive science research	Promoting and Maintaining Good Health: <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare 		<ul style="list-style-type: none"> ▪ Ongoing operational support for the NNF 	<ul style="list-style-type: none"> ▪ National Neuroscience Facility (10) ▪ Qld Gov (67)
Clinical genetics to coordinate detection and analysis of mutations linked with specific diseases	Promoting and Maintaining Good Health: <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare 	Biotechnology Strategy		<ul style="list-style-type: none"> ▪ Ludwig Institute (38)
Systems biology infrastructure	Promoting and Maintaining Good Health: <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare 		<ul style="list-style-type: none"> ▪ National Broadband network – also see ‘Systemic Infrastructure’ 	<ul style="list-style-type: none"> ▪ Ludwig Institute (38) ▪ Monash University (57)
Infrastructure for research in molecular biology	Promoting and Maintaining Good Health: <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare 		<ul style="list-style-type: none"> ▪ Molecular Biology Facility (BioScience North Australia) for NT 	<ul style="list-style-type: none"> ▪ NT Government (23)
Infrastructure to facilitate pre-clinical and development research and clinical trials Including: <ul style="list-style-type: none"> ▪ scale-up manufacturing facilities for biotechnology and pharmaceutical industries 	Promoting and Maintaining Good Health: <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare Frontier technologies for Building and Transforming Australian Industries	Biotechnology Strategy – esp. National Biotechnology Research Cooperation Pharmaceuticals Industry Action Agenda	<ul style="list-style-type: none"> ▪ National biopharmaceutical production facility/ies for biological reagents, proteins, monoclonal antibodies etc for early stage clinical trials ▪ National clinical trials network ▪ Integrated platform for pre-clinical and development research. 	<ul style="list-style-type: none"> ▪ Ludwig Institute (38) ▪ Bio21 (9) ▪ NSW ministry for Science and Medical Research (68) ▪ Phoenix Biologix (42) ▪ Qld Gov (67)

				<ul style="list-style-type: none"> ▪ Monash University (57)
Infrastructure for Indigenous health research	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare 		<ul style="list-style-type: none"> ▪ Indigenous health research facility in Northern Territory 	<ul style="list-style-type: none"> ▪ NT Government (23)
<p>Proposed priority areas for medical research capability</p> <ul style="list-style-type: none"> ▪ Cancer research ▪ musculoskeletal disease ▪ diet/nutrition 	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare 		<ul style="list-style-type: none"> ▪ National Cancer Institute to integrate research and service delivery 	<ul style="list-style-type: none"> ▪ SA Government (20) ▪ Ludwig Institute (38) ▪ Qld Government (67)
<p>Health research informatics networks, including networks related to:</p> <ul style="list-style-type: none"> ▪ genomics, proteomics, phenomics, stem cell and neuroscience research ▪ collating genome sequence data with infectious and immunological disease mechanisms ▪ genetic epidemiology ▪ population based linked health information systems 	<p>Promoting and Maintaining Good Health:</p> <ul style="list-style-type: none"> ▪ A healthy start to life. ▪ Ageing well, ageing productively. ▪ Preventative healthcare <p>Frontier technologies for Building and Transforming Australian Industries</p>	<p>Biotechnology Strategy – Access to biological and genetic resources</p>	<ul style="list-style-type: none"> ▪ National Clinical Genetics and Informatics system 	<ul style="list-style-type: none"> ▪ NSW Government – NSW Health (68) ▪ Australian Proteome Analysis Facility (7) ▪ NHMRC (70) ▪ Australian Phenomics Facility (4)
Compound library and screening network – to facilitate small molecule compound testing	<p>Promoting and Maintaining Good Health</p> <ul style="list-style-type: none"> ▪ Healthy start ▪ Ageing well, ageing productively ▪ Preventative healthcare <p>Frontier technologies for Building and Transforming Australian Industries</p>		<ul style="list-style-type: none"> ▪ National Compound Library and Screening network 	<ul style="list-style-type: none"> ▪ Griffith Uni (13)

<u>International</u>				
Participation in international genomic initiatives	Promoting and Maintaining Good Health		<ul style="list-style-type: none"> ▪ Australian node of mouse 'knock out' library 	<ul style="list-style-type: none"> ▪ Bio21 (9)
Participation in international neuroinformatic initiatives	Promoting and Maintaining Good Health		<ul style="list-style-type: none"> ▪ International Neuroinformatic Coordinating Facility 	
Participation in international bio-networks and programmes	Promoting and Maintaining Good Health		<ul style="list-style-type: none"> ▪ Subscription to the European Molecular Biology Laboratories (EMBL) 	

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Frontier technologies for building and transforming Australian Industries				
Infrastructure for R&D into nano-structured and other advanced materials and photonics-based technologies:	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Breakthrough science ▪ Frontier technologies Promoting and Maintaining Good Health	Advanced Manufacturing Action Agenda (DITR) Australian Tooling Technology Roadmap (DITR) PMSEIC Nanotechnology Working Group	‘National Manufacturing Initiative’ with facilities for: <ul style="list-style-type: none"> ▪ characterisation of material form and function at the molecular/ nano level ▪ development of hybrid and nano-scale structures ▪ nano-patterning and manipulation of matter at the nano-scale ▪ materials design and testing ▪ biomimetic materials and processes ▪ scaling-up. 	<ul style="list-style-type: none"> ▪ CMIT (59) ▪ APAF (7) ▪ Australian Genome Research Facility (35) ▪ Australian National University (51) ▪ CSIRO (informal)
Infrastructure to develop intelligent system design and manufacturing systems	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Breakthrough science ▪ Frontier technologies 	Advanced Manufacturing Action Agenda (DITR) Australian Tooling Technology Roadmap (DITR)	<ul style="list-style-type: none"> ▪ Facilities to develop virtual tools to improve product design, streamline prototype testing and manufacturing and adaptable production systems 	<ul style="list-style-type: none"> ▪ South Australian Government (20) ▪ CMIT (59)
Infrastructure supporting synchrotron-based research Including: <ul style="list-style-type: none"> ▪ Instruments for analysis of synchrotron radiation ▪ Additional beamline capacity See also ‘Promoting and Maintaining Good Health’.	All	<i>National Science Case for the Initial Suite of Beamlines</i> (2003)	<ul style="list-style-type: none"> ▪ Additional beamlines for the Australian synchrotron, including beamlines supporting nano-level characterization and patterning ▪ Ancillary equipment for beamlines ▪ Biomedical and biotechnology relevant beamline instruments 	<ul style="list-style-type: none"> ▪ Bio21 (9) ▪ Australian Synchrotron Project (24) ▪ CMIT (59) ▪ Australian Research Synchrotron Program (53) ▪ Ludwig Institute for Cancer

			<ul style="list-style-type: none"> Commonwealth participation in Beamline Funding Partners 	<ul style="list-style-type: none"> Research (38) <ul style="list-style-type: none"> CSIRO (informal)
Neutron scattering capability (beyond commissioning of OPAL and initial suite of instruments)	<p>Frontier technologies for building and transforming Australian Industries</p> <ul style="list-style-type: none"> Breakthrough science Frontier technologies <p>An Environmentally sustainable Australia Promoting and Maintaining Good Health</p>		<ul style="list-style-type: none"> Additional instruments and second guide for OPAL 	<ul style="list-style-type: none"> ANSTO (48)
Facilities for R&D into food and wine processing and manufacturing	<p>Frontier technologies for building and transforming Australian Industries</p> <ul style="list-style-type: none"> Frontier technologies <p>Promoting and Maintaining Good Health</p>	<p>National food industry strategy</p> <p>RR&DC R&D priorities</p> <ul style="list-style-type: none"> Transformation in Australian food and functional food industries Maintain and Improving confidence in the integrity of Australian agricultural food products 	<ul style="list-style-type: none"> Metabolomics facilities 	<ul style="list-style-type: none"> South Australian Government (20) Premiers Science and Research Council (SA) (27) Qld Gov (67)
Facilities for R&D into sustainable biomass fibre production	<p>Frontier technologies for building and transforming Australian Industries</p> <ul style="list-style-type: none"> Frontier technologies <p>An Environmentally Sustainable Australia</p>		<ul style="list-style-type: none"> National facility for evaluation of biomass fibre resources (various proposed partners) 	<ul style="list-style-type: none"> Ensis (CSIRO)
Multi purpose space platforms for satellite development and operation	<p>Frontier technologies for building and transforming Australian Industries</p> <ul style="list-style-type: none"> Frontier technologies <p>An Environmentally Sustainable Australia</p>		<ul style="list-style-type: none"> National facility for the development, testing and operation of small scientific satellites 	<ul style="list-style-type: none"> CRC Satellite Systems (34)
Free Electron Laser (FEL) capability	<p>Frontier technologies for building and transforming</p>		<ul style="list-style-type: none"> Build Australian based facility or partner in offshore 	<ul style="list-style-type: none"> Monash University (57)

	Australian Industries <ul style="list-style-type: none"> ▪ Frontier technologies 		facility	
Manufacturing process innovation	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Frontier technologies 			<ul style="list-style-type: none"> ▪ PSRC SA (27)
Infrastructure to support commercialisation and technology transfer		National Biotechnology Strategy		<ul style="list-style-type: none"> ▪ Qld Gov (67)
<u>International</u>				
Access to offshore synchrotron radiation sources until 2008	All		<ul style="list-style-type: none"> ▪ Maintain Australian Synchrotron Research Programme until Australian Synchrotron fully operational 	<ul style="list-style-type: none"> ▪ ASRP (53)

Proposed Capability (by primary associated National Research Priority (NRP))	National Research Priorities and associated priority goals	Relevant processes, policies or programmes	Suggested implementation options	Relevant Submissions
Safeguarding Australia				
<p>Infrastructure to enhance Australia's biosecurity</p> <p>Including:</p> <ul style="list-style-type: none"> ▪ biosurveillance ▪ disease control ▪ genomic, proteomic and metabolomic facilities focussed on biosecurity 	<p>Safeguarding Australia</p> <ul style="list-style-type: none"> ▪ Protecting Australia from invasive diseases and pests ▪ Critical Infrastructure (protecting key infrastructure in areas such as finance, energy, communications and transport) <p>An Environmentally Sustainable Australia</p>	<p>Primary Industries Standing Committee Strategy for Rationalisation of Agricultural R&D</p> <p>Biotechnology Strategy for Agriculture, Food and Fibre (DAFF)</p> <p>Cooperative Framework on Tropical Science, Knowledge and Innovation (NT, Qld, WA)</p> <p>National Communicable Disease Surveillance Strategy</p>	<ul style="list-style-type: none"> ▪ Australian Centre for Disease Control (established around the Australian Animal Health Laboratory and the proposed National Biosecurity Centre) ▪ Plant disease diagnosis and research facility ▪ Build new containment facilities at AAHL for research on zoonotic diseases ▪ Northern Containment Facility ▪ National Centre for plant transformation – TILLING ▪ Metabolomic facility ▪ National Bioproteomics and clinical proteomics facility ▪ Plant containment facility network (CSIRO) ▪ Maintain and upgrade infrastructure supporting biosurveillance, including genetic, epidemiological and statistical and aspects of outbreak detection and response 	<ul style="list-style-type: none"> ▪ APAF (7) ▪ Australian Genome Research Facility ▪ University of Tasmania (37) ▪ Ludwig Institute for Cancer Research (38) ▪ Australian Genome Alliance (45) ▪ New South Wales Government (68) ▪ Ludwig Institute of Cancer Research (38) ▪ CSIRO (informal) ▪ NT Government/Charles Darwin Uni (23)

<p>Improving Australia's capacity to identify, detect, predict and manage invasive native and exotic pests, including invasive marine species</p> <p>This capability overlaps with capabilities identified under 'An Environmentally sustainable Australia</p>	<p>Safeguarding Australia</p> <ul style="list-style-type: none"> ▪ Protecting Australia from invasive diseases and pests ▪ Critical Infrastructure (protecting key infrastructure in areas such as finance, energy, communications and transport) <p>An Environmentally sustainable Australia</p>	<p>National and State Biodiversity Strategies</p> <p>Australian Biological Resources Study</p> <p>In line with QLD governments strategic objectives</p>	<ul style="list-style-type: none"> ▪ Diagnostic facilities for exotic plant and animal diseases and invasive plants and animals ▪ Enlarge the current capacity at AAHL ▪ National centre for mycology focussing on Australian species ▪ Bio security zone in NT including disease research and containment facilities ▪ Create and maintain reference collections of plant and animal pathogens and pests ▪ Develop an up-to-date widely accessible and priority driven catalogue of Australia's native fauna and flora which extends to all exotic species of plants and animals 	<ul style="list-style-type: none"> ▪ Australian Museum (1) ▪ Botanic Gardens Trust (3) ▪ Council Heads of Australian Herbaria (19) ▪ AGRF (45) ▪ NT Government /Charles Darwin University ▪ ANSTO (48) ▪ Australian Marine Sciences Association (56) ▪ Council of Australian Museum Directors (21) ▪ Monash University (57) ▪ Australian Marine Sciences Association (56)
<p>Improved capacity to fight terrorism and crime</p>	<p>Safeguarding Australia</p> <ul style="list-style-type: none"> ▪ Protecting Australia from terrorism and crime ▪ Transformational defence technologies <p>Frontier technologies for building and transforming Australian Industries</p>		<ul style="list-style-type: none"> ▪ Engaging the forensic science sector through the National Institute of Forensic Science (NIFS) in developing better techniques for fighting crime and providing more probative evidence 	<ul style="list-style-type: none"> ▪ National Institute of Forensic Science (NIFS) (5) ▪ SA DFEEST (20)
<p>Facilities to respond to food and water related emergencies</p>	<p>Safeguarding Australia</p> <ul style="list-style-type: none"> ▪ Critical infrastructure (protecting key infrastructure in areas such as finance, energy, 	<p>Biotechnology Strategy for Agriculture, Food and Fibre (DAFF)</p>	<ul style="list-style-type: none"> ▪ Build an integrated network of analytical laboratories ▪ Upgrade and integrate animal, plant and 	

	communications and transport)		human health laboratories' capability and capacity to detect and identify biological, chemical and radiological agents in food and inputs to food	
Improved understanding of critical infrastructure and disaster management Including: <ul style="list-style-type: none"> ▪ Better data on vulnerabilities ▪ Improved methods and technologies for managing fire, detection of human action, protection equipment, disaster propagation etc 	Safeguarding Australia <ul style="list-style-type: none"> ▪ Critical infrastructure (protecting key infrastructure in areas such as finance, energy, communications and transport) 	Cities and Critical Infrastructure Project (Geoscience Australia)	<ul style="list-style-type: none"> ▪ National database of critical infrastructure to facilitate risk modelling and analysis ▪ Centre for Critical Infrastructure Protection 	<ul style="list-style-type: none"> ▪ Geosciences Australia (40) ▪ DSTO (36) ▪ CSIRO (CMIT)
Infrastructure for research to improve Australia's E-security Including: <ul style="list-style-type: none"> ▪ Combating cybercrime ▪ Authentication technologies ▪ Development of trusted systems ▪ Network security ▪ Security policy 	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Promoting an innovation culture and economy ▪ Frontier technologies ▪ All 		<ul style="list-style-type: none"> ▪ Facility for developing and testing Supervisory Control and Data Acquisition (SCADA) computing control and security systems and standards 	

Proposed Capability (Related primary to the advancement of pure knowledge)	National Research Priorities and associated priority goals	Relevant processes, policies or programmes	Suggested implementation options	Relevant Submissions
Gravitational research (part of network of international gravitational observatories)	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Frontier technologies 	Decadal Review of Australian Astronomy (anticipated in Sept 2005)	<ul style="list-style-type: none"> ▪ Extension of existing AIGO 	<ul style="list-style-type: none"> ▪ AIGO (18)
Radio astronomy	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Frontier technologies 	Decadal Review of Australian Astronomy (anticipated in Sept 2005)	<ul style="list-style-type: none"> ▪ SKA 	<ul style="list-style-type: none"> ▪ University of Tasmania (37) ▪ APAF (7)
Access to next generation optical astronomy instrument/s	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Frontier technologies 	Decadal Review of Australian Astronomy (anticipated in Sept 2005)	<ul style="list-style-type: none"> ▪ Optical/infrared ANU telescopes ▪ Continued participation in Gemini ▪ Participation in ELT project ▪ Antarctic telescope ▪ Upgrade of Anglo-Australian Observatory ▪ Australian Virtual Observatory 	<ul style="list-style-type: none"> ▪ ANU (51) ▪ AATB ▪ APAF (7)
High energy physics	Frontier technologies for building and transforming Australian Industries <ul style="list-style-type: none"> ▪ Frontier technologies ▪ Breakthrough science 		<p>Maintain national facilities at the ANU</p> <ul style="list-style-type: none"> ▪ H-1 Helic high-temperature plasma research facility ▪ Heavy ion accelerator facilities <ul style="list-style-type: none"> ▪ Fund access to CERN EP Linear Collider ▪ Australian participation in ITER 	<ul style="list-style-type: none"> ▪ APAF (7) ▪ ANU (51)