crc·si

COOPERATIVE RESEARCH CENTRE FOR
SPATIAL INFORMATION

ANNUAL REPORT 2010-11

Essential participants

43 Version 2 Pty Ltd

Curtin University of Technology

Department of Environment and Resource Management (QLD)

Department of Sustainability and Environment, (VIC)

Ergon Energy Corporation Limited

Geoscience Australia

Land and Property Management Authority (NSW), now known as Land and Property Information (LPI) of the Department of Finance and Services, (NSW)

Landgate, (WA)

Queensland University of Technology

The University of New England

University of Canterbury

University of Melbourne

Established and supported under the Australian Government's Cooperative Research Centres Program.

Contents

Statement of Purpose

The CRCSI is an unincorporated joint venture set up under the Cooperative Research Centre Program of the Australian Commonwealth Government. The purpose of the CRCSI is to build critical mass in research ventures between end-users and researchers tackling clearly articulated, major challenges for the end-users using the fundamental spatial technologies of global navigation satellite systems, spatial data infrastructures, data fusion and spatial feature extraction. The CRCSI brings powerful collaboration on all critical research and education issues that involve a spatial aspect. In doing so the CRCSI seeks to accelerate the take up of spatial science in key end-users, spawning major innovation and productivity advances in the key industry sectors of Health, Defence, Energy & Utilities, Sustainable Urban Development and Agriculture, Natural Resources and Climate Change.

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Executive Summary

The CRCSI started its second term of eight and half years on 1 January 2010 following a successful extension bid in Round 11. The period January to June 2010 saw the transition from the first term of the CRCSI ("CRCSI-1 from 2003 - 2009") to its 2010-2018 term ("CRCSI-2"). This period involved the settling in of 78 signed up or intended participants, the establishment of the new seven person Board, formation of a new management structure, completion of an operational plan and establishment of the new research program.

Achievements

Research

Fifteen CRCSI-1 carry-over projects were successfully completed. Under CRCSI-2 the research portfolio has now grown to include 13 internally funded projects. There is strong evidence of early progress. Three prominent examples include:

- Detailed planning has confirmed that the Positioning Program will deliver new theories for the estimation and validation of GNSS carrier phase integer ambiguities as world first. These will underpin precise signal processing for GPS and the other five Global Navigation Satellite Systems that are being launched by other nations.
- The 3D image concept developed by the CRCSI provides a framework for rigorously integrating multi-source imagery and ranging data for the purposes of extracting meaningful spatial information products using automated feature extraction technologies. CRCSI researchers have the opportunity to be the first to fully realise and document the 3D image concept as well as playing an active role in the development of a data format for the delivery of 3D image data. The latter could result in the creation of an international industry standard.
- Fundamental to health improvement is good evidence and information that can be acted on with immediacy and confidence. The CRCSI's Health Program is driving a revolution in health information dissemination with the recent release of the Health Tracks Reporting tool for testing by end users.

The research program also yielded 75 publications in 2010-11, including 26 in refereed journals and 26 in refereed conference publications.

The Minister for Climate Change and Energy Efficiency the Hon Greg Combet MP launched the new very high resolution digital elevation models and sea level rise modelling tools developed by the CRCSI in December.

Commercialisation / Utilisation

Utilisation

The Intellectual property from CRCSI-1 forms the background intellectual property to the research in CRCSI-2 by agreement with the 70 participants from CRCSI-1.

Scanalyse Pty Ltd, a spin out company of CRCSI-1, continues to expand overseas and now has 18 employees.

iintegrate Systems Pty Ltd USA made its first North American sale to California ISO which serves 30 million customers.

Education

Students are involved in all major projects. Nine students commenced with either full or top-up Scholarships, bringing the total cohort of continuing and commencing students to 20. In addition four students completed their studies.

Obstacles

There were no specific impediments experienced during the period, which is in part attributable to the very strong support from the participant base and a willingness by the new Board to embrace a collaborative approach across the national stakeholders in the spatial information community during the critical set up phase.

However it should be noted that Program 1 (Positioning) and Program 3 (Spatial Infrastructure) are off to a slower start than anticipated. In both Programs the end users are driving the timetable. With Program 1 the formulation of the detailed research proposals required a great of debate from many stakeholders around Australia and New Zealand. This is now complete and the detail has been agreed. In Program 3 the intense research effort is predicated on the establishment of the Australia and New Zealand Spatial Marketplace. It took six months longer than originally anticipated to commence the first phase build of the Marketplace. The contract was signed in August 2011. A consortium of peak government and private sector bodies is responsible for this contract, not the CRCSI.

End-user Environment

Communication channels were established in CRCSI-2 with participants grouped into Colleges: government; research and education; and industry, to facilitate the timely flow of information and to ensure the accountability of management to the participants.

There were no major changes in the end-user environment that significantly affected the CRCSI. Program Boards were established with very senior end users in each case as Chairs to ensure a strongly end user driven research strategy and projects.

Impacts

It is early days for the new research programs of the CRCSI in its second term and the new programs are yet to yield significant impacts. A number of projects that carried over into the new CRCSI yielded substantial benefits including; the National Data Grid, the Automated analysis of Terrestrial Laser Scanner in support of infrastructure asset management, and the implementation of the Spatial Data Health pilot. These are discussed more fully in the body of this report.

A significant number of new partners have been brought into the CRCSI and the inclusion of New Zealand as a major partner sees the creation of a strong bi-lateral international partnership through the government agency Land Information New Zealand, a leading university in the University of Canterbury and four New Zealand companies. The increased contribution levels for all government and 43pl members have had a significant impact on the spatial information industy itself, particularly the role that R&D can play in their future. There was good continuity of membership from CRCSI-1 to CRCSI-2:

- 12 of the former 14 Core participants have chosen to participate in the new CRCSI-2 as either Essential or Other Participants
- 33 of the 48 companies in 43pl have chosen to participate in CRCSI-2
- Both supporting participants have chosen to participate in CRCSI-2

The overall retention proportion from CRCSI-1 to CRCSI-2 was 73% for all participants.

Governance and Management

Strategic Plan

The Board, Executive Management and the CRCSI's key stakeholders collaborated to develop the CRCSI Strategic Plan in 2011. The plan provides a succinct outline of the Centre's vision and objectives in the key areas of Research and Education, as well as the standards by which success will be measured. It will be reviewed annually. The Strategic Plan sets out:

CRCSI Vision: Spatial enabling Australia and New Zealand

The CRCSI will be widely recognised for its high impact, collaborative research that leads to accelerated industry growth, improved social well-being and a more sustainable environment.

Our Values

We will be collaborative by nature in our relationships, strive for excellence in our research, and always aim to be transformational in our impact.

Our Strategic Objectives

1. **National Precise Positioning (Program 1)**

   Objective 1: To conduct research that solves the signal processing and economic impediments to the creation of a sparse, continental-scale, precise positioning multi-GNSS network operating at 2 cm (x and y) accuracies.

2. **Automated Generation of Spatial Information Products (Program 2)**

   Objective 2: To develop our research capability to enable our CRC and our partners to become Australia's leading centres for automated processing of information from terrestrial, airborne and satellite platforms and from existing data sources.

3. **Infrastructure for an Australia New Zealand Spatial Marketplace (Program 3)**

   Objective 3: To identify and solve the research issues that will enable the operators of the Australia and New Zealand Spatial Marketplace to construct the infrastructure, operate the marketplace and to enable our CRCSI partners to create value-added applications with new technologies.

4. **Applications (Program 4)**

   Objective 4: To include but not be limited to the realisation of high impact use of the CRCSI's research in the following areas: Agriculture and Natural Resources affected by Climate Change (4.1) through the creation of a biomass and carbon monitoring system for application on farms at sub-paddock scale on a weekly basis, and through improved environmental monitoring; Defence (4.2) by adapting the emerging capabilities of CRCSI's research portfolio; Energy Utilities (4.3) to enable remote monitoring of the condition of built assets in near real time; Health (4.4) by helping agencies to spatially enable their clinical databases; and Urban development (4.5) to build new tools, paradigms and theories including agglomeration economy and greyfield regeneration to support sustainable urban development.

5. **Education (Program 5)**

   Objective 5: By 2012 the CRCSI will have a plan to improve the skilled capability of the Australian and New Zealand workforce by working with the education providers. As a priority by 2018 the CRCSI will have invested in at least 50 PhDs with our university partners.

6. **Industry Development and Sustainability (Program 6)**

   Objective 6: To establish a program of assistance for our partners, in particular 43pl, that helps them find ways to develop and exploit CRCSI IP; and to establish a program for 43pl members in particular and the industry generally that helps them improve

the management of their internal innovation and R&D programs. These programs seek to encourage investment in R&D by spatial businesses.

Objective 7: Commissioned research; is expected to generate an additional $10M of activity in the CRCSI (from January 2010) tackling complex research needs involving multiple partners from both the public and the private sectors. Initially most of this research will be taken on around the existing core expertise. In time this will grow into new areas of expertise.

Governance: Board, Committees and Key Staff

The CRCSI is an unincorporated joint venture (UJV) under the terms and conditions set out in the Commonwealth Agreement and the Essential Participants Agreement[1].

The CRCSI itself does not have a separate legal existence however it is governed, managed and operated by a single company, Spatial Information Systems Research Limited (SISR) which itself is owned by the UJV. SISR is a company limited by guarantee, which acts as trustee of the CRCSI Intellectual Property, employs the management staff, undertakes contract research work and otherwise manages the Centre's operations. SISR was designated as an income tax exempt charitable institution by the Australian Tax Office in May 2011, meaning that no income tax will be payable by the company in any financial year should a profit be realised. The Board of the company is also the Board of the CRCSI UJV. Each Essential Participant may be a member of SISR.

At present there are seven Essential Participants who are members of SISR: They are:

- 43pl (43 Pty Ltd, version 2)
- Curtin University of Technology
- Department of Sustainability and Environment, (VIC)
- Land and Property Information, (NSW)
- Landgate, (WA)
- Queensland University of Technology
- University of New England

There are 78 formal participants in the CRCSI from the government, private and research (university) sectors with a further 10 organisations committed through letters of agreement. They have been formed into three Colleges, one representing each of these three sectors; 43pl (with 56 SMEs), the Research and Education College (primarily universities), and the Government Agencies College managed by ANZLIC. The Colleges operate independently of each other and help represent the views of their respective members especially in the formation of policy, the development of strategy, nominations of candidate directors to the Board and the admittance of new participants. They also provide a vital mechanism for two-way feedback and communication.

The seven member skills-based Board, appointed after an extensive College led nomination and selection process, was formed in early 2010 with the non executive directors appointed for an initial term of one year with provision for renewal. The Board met formally five times in 2010-11 and there were no changes to Board membership during the period.

The Board is responsible for the governance and operations of the CRCSI and SISR. The Board has adopted formal protocols, detailing its functions and responsibilities. These are reviewed annually. While the Board has overall control of the CRCSI, it has delegated a range of its powers, duties and responsibilities to its committees and executive management teams.

The Board is advised by the Research Investment Committee, the Audit & Risk Committee and the Nominations and Remuneration Committee. A comprehensive suite of governance protocols, policies and guidelines have been implemented. The Board and supporting Committees will review these periodically to assess the performance of the CRCSI and to ensure

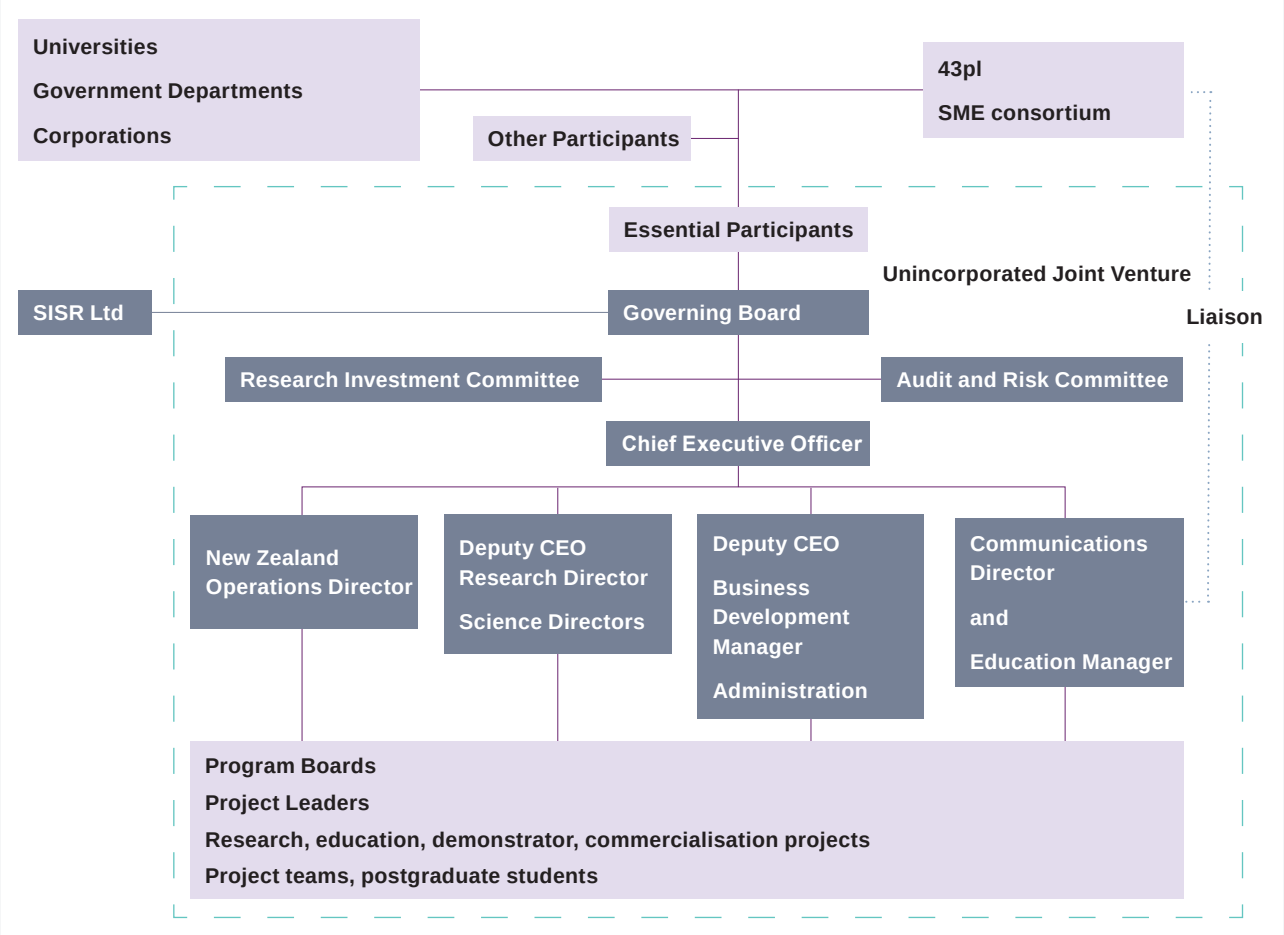
[1]The Commonwealth Agreement governs the provision of $32.2M of Commonwealth funding to the CRCSI over the period January 2010 to June 2018 and sets up the relationship with the Essential Participants who make up the organisation who are the equity partners of the CRCSI on the basis of their matching cash contributions.

policies remain up to date with current regulatory requirements.

Management comprises of an Executive and support staff, as well as Program Science Directors, Program Managers, and Project Leaders. Program Boards, a newly implemented level of management, are program-wide panels tasked with the responsibility of reviewing the strategic direction of the research programs and making recommendations to the CRCSI Board with regard to the continuation, expansion, change in direction or termination of projects in their program. These Boards are chaired by a lead end user and meet several times a year. Project Management Groups meet quarterly to review each project's progress and are Chaired by a lead end user.

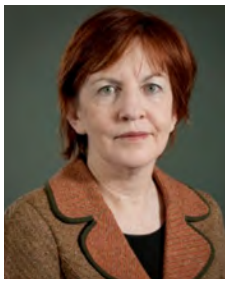
Roles and Accountabilities

Board	Executive	Science Directors	Project Leaders
Strategic direction	Strategic Planning	Science and research excellence	Research leadership
Policy	Operational Management	Independent project input and advice (project development work quality; technical and commercial networks)	Project performance
Budget	Business Development	Internal links	Project stakeholder communication and relations
Strategic Plan Performance	Commercialisation	Research utilisation	Project management (staff and budget), esp. meeting milestones & reporting
CEO appointment	Communications (in & out)	Market interface	Internal liaison
	Ensuring programs interconnect and link to the market		
	Member and client relations		



Directors

Mary O'Kane (Chair)



Mary O'Kane is a consultant and Company director. She is Executive Chairman of Mary O'Kane & Associates Pty Ltd, advising governments and the private sector on innovation, research, education and development. She is also NSW Chief Scientist and Scientific Engineer, Chair of the Development Gateway Board and Chair of the Board of the Australian Centre for Renewable Energy.

Professor O'Kane was Vice-Chancellor and President of Adelaide University from 1996-2001 and Deputy Vice-Chancellor (Research) from 1994-96. She was also Professor of Electrical and Electronic Engineering within the University and now holds the title of Professor Emeritus.

She has served on several boards and committees in the public and private sectors. She is a member of the Tax Concession Committee, the PSMA Ltd Board, the Australian Business Foundation Board and the Capital Markets CRC Board. She was a Director of FH Faulding & Co Ltd and was a member of the Australian Research Council, the Cooperative Research Centres Committee and the Board of the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

She is a Fellow of the Academy of Technological Sciences and Engineering and a Fellow of the Institution of Engineers, Australia.

Peter Woodgate

Peter Woodgate has been CEO of the Cooperative Research Centre for Spatial Information (CRCSI) since June 2003. Peter was previously CEO of RMIT's Geospatial Science Initiative. During this period he was responsible for a number developments that included helping establish RMIT University's first spin off Company, Spatial Vision Innovations Pty Ltd; the creation of the Risk and Community Safety Research Centre in partnership with Emergency Management Australia and the Australian National University; and the establishment of RMIT's Global Sustainability Institute.

Peter is currently a Member of the Executive Committee of the International Society of Digital Earth; Director of the Terrestrial Ecosystems Research Network; Foundation Chair of the Global Network for Networks (NfN); a foundation member and Chairman of the Research Committee of UNESCO's Mornington Peninsula and Westernport Biosphere Reserve Foundation; and Board Member UNESCO World Heritage International Centre on Space Technologies for Natural and Cultural Heritage (WHIST).

He has a Doctorate in Business Administration from RMIT University, a Master of Applied Science from the University of New South Wales and a Degree in Forest Science from the University of Melbourne.

Drew Clarke

Drew Clarke was appointed Secretary of the Commonwealth Department of Resources, Energy and Tourism in April 2010.

His previous position was Deputy Secretary with responsibilities across the three sectors. Drew's earlier roles include Head of the Energy and Environment Division, where he was responsible for energy market reform, energy

security and energy-related climate change policy, head of AusIndustry, the business program delivery agency, and leadership of science agencies.

Drew holds an MSc from Ohio State University, and was awarded a Public Service Medal in 2009 for his work in energy market reform and clean energy. He began his public sector career as a surveyor working in Australia and Antarctica.

Malcolm McCoy

Malcolm McCoy has over 20 years experience as a Director of survey and spatial companies and 35 years in the industry. He has been instrumental in undertaking two recent mergers of survey companies to form Vekta and prior to that to create Survey21. As part of this process he has been involved in lengthy due diligence procedures, and accordingly has been appointed Managing Director of Vekta, one of a few truly national survey and spatial consultancies. His role is to look at the strategic directions of the Company and to implement the Company Business Plan.

His areas of expertise are land and engineering surveying but also strategic planning, project management, and financial management.

Tina McMeckan

Tina McMeckan has 20 years experience as a Company director and senior executive in corporate governance, enterprise development, equity investment and industry reform. Her specific skills are in the energy sector and commercialisation of science and technology.

Tina has extensive Board expertise in public and private utility infrastructure including power production, networks and retailing businesses in the gas and electricity industries. She is a Director of the Global Carbon Capture and Storage Institute, and an independent Director of SPAusnet. Her other appointments as a Director have included Alinta Limited, United Energy, Snowy Hydro Trading, the Westar and Kinetik Energy Group, Victorian Power Exchange, and Solaris Power.

Her significant experience in technology development includes current appointments as Chairman of the Centre for Eye Research Australia and NanoVentures Australia Ltd and a Director of Circadian Technologies Ltd, and the Vision Cooperative Research Centre. She is a past Member of the Funds Management Committee of the AusIndustry Research and Development Board. She is also a Council Member of Norton Rose Law Partnership. A Bachelor of Liberal Arts and Sciences from San Diego State University in California, Ms McMeckan also holds a Master of Business Administration from the University of Melbourne and is a Fellow of the Australian Institute of Company Directors.

Warwick Watkins AM

Warwick Watkins AM is the Surveyor General of NSW and Registrar General of NSW. He has studied at the Harvard Business School in Boston, USA and holds postgraduate degrees and diplomas from the University of New England, including a Masters in Natural Resources, and a Dip Ag with Honours from Hawkesbury Agricultural College.

He is also the Norfolk Island Surveyor General; Deputy Chancellor of the University of Technology, Sydney; Chair, NSW Spatial Council; President of the NSW Board of Surveying and Spatial Information; Chair of the NSW Geographical Names Board; Chair, Australian and New Zealand Land Information Council; Chair of the Steering Committee, Australian Spatial Consortium; Deputy Chair, CSIRO Water for a Healthy Country Research Flagship Advisory Council; Fellow, Australian Academy of Technological Sciences and Engineering; Fellow,

Australian Property Institute; Fellow, Royal Institution of Chartered Surveyors and Honorary Fellow of the Institution of Surveyors of NSW.

Graeme Wright

Professor Graeme Wright is the Acting Deputy Vice-Chancellor, Research and Development at Curtin University, responsible for all research, research training, and commercialisation and knowledge transfer activities.

Since 2004 Professor Wright has held senior roles at Curtin University including Executive Dean, Associate DVC Research Training and now acting DVC Research & Development. He has extensive knowledge and experience in education and research, and engagement with higher education policy at strategic level.

Graeme has extensive experience on Boards and Committees of research centres and CRCs, liaison with industry and negotiation of funding agreements, and broad research knowledge in spatial information sciences.

He has been closely involved with the CRC for Spatial Information since the initial bid preparation in 2003 then as a member of the CRCSI's Research & Education Committee (REAC) and the CRCSI Board, and as the Research and Education College representative on the "CRCSI-2" Steering Committee. He chairs the Research and Education College. He is also the Board's appointment to the Chair of the Research Investment Committee.

Directors' Meetings

The table below sets out the number of Board and Board committee meetings held and the number of meetings attended by each Director and/or Board Committee member.

Notes:

1. *Board meetings were held on Aug 30th 2010, Oct 7th 2010, Dec 20th 2010, March 23rd 2011 and June 10th 2011.*
2. **Appointed to the Nominations and Renumeration Committee which did not meet during the period*
3. *W. Poole's term on the Audit and Risk Committee commenced on May 25, 2011*
4. *B. Thompson resigned from the Research and Investment Committee in May 2011*
5. *W. Watkins resigned from the board in July 2011.*

Directors/ Committee Members	Board of Directors		Audit & Risk Committee		Research Investment Committee		Nominations & Remuneration Committee	
Number of meetings held	**6**		**3**		**5**		**0**	
Directors	**Eligible**	**Attended**	**Eligible**	**Attended**	**Eligible**	**Attended**	**Eligible**	**Attended**
M. OKane	6	6						
P.Woodgate	6	6			5	5	*	
W. Watkins	6	4					*	
G. Wright	5	5			5	5		
A. Clarke	6	5					*	
T. McMeckan	6	5	3	3				
M.McCoy	6	6	3	3				
Committee Members	**Eligible**	**Attended**	**Eligible**	**Attended**	**Eligible**	**Attended**	**Eligible**	**Attended**
J. Bangay					5	4		
A. Berrill					5	5		
M.Bradford					5	5		
T.Cantoni					5	4		
G. Perkins					5	4		
S. Ramage					5	4		
B. Thompson					4	3		
W.Poole			1	1				

Audit and Risk Committee

The Audit and Risk Committee met three times in the period. Its function is to provide assistance and advice to the Board to discharge its responsibilities pertaining to financial reporting, audit and risk management. The Committee has adopted a formal Charter outlining its functions and responsibilities. This three member Board appointed committee is comprised of two board members and one member who has considerable accounting and auditing expertise, sourced from a CRCSI Other Participant.

PKF Australia Ltd was reappointed as the external auditors and tax advisers for the CRCSI, SISR and 43pl for the reporting period. The performance of the external auditor is reviewed annually by the Audit and Risk Committee through consultation with the CRCSI Management and a recommendation provided to the Board regarding reappointment for the following year.

Research Investment Committee

The purpose of the Research Investment Committee is to advise the Board on investment decisions relating to the Research Program, including utilisation issues, market applications of the science and technology within the activities, and any technical, research and education issues.

Appointment to the ten member committee is by the Board who have the right to vary membership numbers as required. The committee met five times during the period to review research Project proposals and initiatives. Funding recommendations for Board approval resulted in new Projects in three out of the four CRCSI research Programs.

Nominations and Remuneration Committee

This Committee provides advice and recommendations to the Board on issues relating to Board composition and succession and for establishing and maintaining recruitment, retention and termination policies and practises for senior executives and independent directors. The Committee did not meet in the period.

Committee Name - Audit & Risk Committee			
Name	**Role**	**Key skills**	**CRCSI Affiliation**
Tina McMeckan	Chair	Board Director – Corporate Governance, Intellectual Property Management and Capital Raising	Independent
Malcolm McCoy	Member	Board Director – Current Spatial Industry experience from SME industry perspective, Corporate Governance	Vekta Pty Ltd (43pl member)
Wayne Pool	Member	Financial Management and Audit	RMIT (Other Participant)

Committee Name - Research Investment Committee		
Name	**Role**	**CRCSI Affiliation**
James Bangay	Member	Ergon Energy: Other Participant – Brisbane, Qld
Arthur Berrill	Member	Independent: DMTI Spatial – Toronto, Canada
Mike Bradford	Member	Landgate: Essential Participant – Perth, WA
Tony Cantoni	Member	Independent: UWA – Perth, WA
Guy Perkins	Member	Independent: 1Spatial – Perth, WA
Scott Ramage	Member	AAM Pty Ltd: 43pl participant – Sydney, NSW
Bruce Thompson	Member	Victorian Dept of Sustainability & Environment: Essential Participant – Melbourne, VIC
Peter Woodgate	Member	CRCSI – CEO
Graeme Wright	Chair	Curtin University: Essential Participant – Perth, WA

Key Staff	Organisation	CRC Position / Role	Time committed
Peter Woodgate	CRCSI	Chief Executive Officer	100%
Graeme Kernich	CRCSI	Business Manager / Deputy CEO	100%
Phil Collier	CRCSI	Research Director	100%
Peter Teunissen	Curtin University	Professor and Science Director (Research Program 1: Positioning)	15%
Clive Fraser	CRCSI	Professor and Science Director (Research Program 2: Automated Feature Extraction)	80%
Kylie Armstrong	Landgate	Program Director (Research Program 3: Spatial Infrastructure)	80%
Kim Lowell	CRCSI	Professor and Science Director (Applications Program 4.1: Agriculture, Natural Resources and Climate Change)	20%
James Semmens	Curtin University	Professor and Science Director (Applications Program 4.4: Health)	13%
Peter Newman	Curtin University	Professor and Science Director (Applications Program 4.5: Urban Sustainable Development)	20%

Note: Appointments are yet to be made to Applications Program 4.2: Defence, and Applications Program 4.3: Energy Utilities.

Participants

CRCSI's Participants, including Essential[2], Other and Third Parties who have provided either Cash or In-Kind contributions to support the Centre's Activities totalled 78 for the period. Of these, 68 Participants are equity holding partners in the Centre holding beneficial ownership rights in Centre IP based in proportional to their aggregate cash contributions to CRCSI.

There were two admissions as Essential Participants during the period, The Univeristy of Canterbury based at Christchurch, New Zealand, and Ergon Energy Corporation, who have upgraded from Other Participant status as they look to take a key role in the emerging Energy Utilities College. For a full List of Participants see Appendix 1.

'Other' Participants who formally signed during the period include Department of Defence through the Defence Imagery & Geospatial Organisation and GEOIDE Inc.

Key relationships have been also been forged with non equity holding partners. These include all of Australia's leading spatial peak bodies; ANZLIC representing the government interests, SIBA representing the private sector interests and SSSI on the professional side, as well as a dozen leading international organisations, all of whom are involved in the key research programs of the centre.

Changes to Essential Participants

Participant's Name	Retiring or New	Department Approval Yes/No
Ergon Energy Corporation (effective 21/12/2010)	New	Yes
University of Canterbury (effective 21/2/2011)	New	Yes

[2]Essential Participants make substantial untied annual cash contributions to the CRCSI; $500,000 for a full jurisdiction, $300,000 for a government agency and $150,000 for a university, in addition to substantial In-Kind contributions. 'Other' Participants make lesser contributions.

Financial Management

Financial Overview

CRCSI operated within its available resources for 2010-11 and ended the year in surplus by $172k against a budget deficit of $3.2M. The result was largely driven by delayed expenditure in the Research Program area as well as cost savings in other areas. The expenditure pattern is consistent with operations in the first centre (for the period 2003 to 2009), whereby as current projects progress and further projects commence, deferred expenditure in the current year is expected to be spent in line with budget in future years. The CRCSI remains in a healthy cash position, with $9.7M cash at bank at the end of the reporting period and has sufficient funding to meet its debts.

After a lengthy negotiation process, the ATO have endorsed the tax-exempt status for SISRL effective from company registration date and no provision for income taxation is therefore required. This also applies to Victorian payroll tax.

An internal review of the financial management systems from the first centre led to the implementation of a new financial management system. The system allows for real time reporting and enhanced ability with regards to forecasting.

Audit

PKF were appointed as external auditors for the period and the related Financial Reports and Statements have been prepared in accordance with the Australian Accounting Standards, International Financial Reporting Standards and Interpretations and Commonwealth guidelines where required. In accordance with these standards and guidelines, the Commonwealth Tables 1 and 2 are prepared on a cash basis. Tables 3 through to 5 are prepared on an accrual basis and the financial reports for SISRL are produced on an accrual basis.

Contributions and Expenditure

CRCSI received total funding for 2010-11 of $13.4M, favourable to budget by $6.0M, a result largely driven by unbudgeted commissioned research from the Commonwealth Department of Climate Change for the Urban DEM Project (+$4.25M). Essential Participant Contributions of $4.1M also surpassed budget expectations by $1.0M, due to additional contract research funds received from Ergon, (+ $1.07M), Landgate (+$175k) and LPI (+$141k) and offset by the deferral of Contributions by QDERM until future years (-$0.5M). The sign-up during the period of DIGO (+$187.5k) as an Other Participant and the University of Canterbury as an Essential Participant (+$150k) further contributed to the favourable outcome.

The sources of CRCSI cash funding were evenly spread between Participant Contributions, Commonwealth Program funds and Contract Research during 2010-11.

The total expenditure for the period of $5.86M was $4.2M below budget. As well as the deferred spending in the research program, savings were achieved across all other budget areas including Directorate (+$383k), Board (+$118k) and Business Development (+$29k).

Two out of every three cash dollars spent by CRCSI went into the Research Program in 2010-11, and this is expected to increase to three of every four dollars in 2011-12, when a full suite of projects in all Program areas will be in progress, and the Research Program budget will be more than double to $10.2M. The remainder was contributed to Business Development (6%) and Administration (28%).

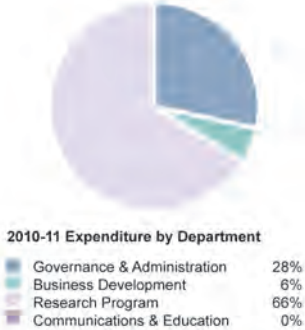
Participant FTE In-Kind contributions also reflect slower progress within the Research Program at 31.6 FTE against a budget of 46.9 for the period. Non staff In-Kind was higher than originally budgeted ($3.9M vs $1.6M) due to the underestimation of overhead contributions in CRCSI's original bid submission. The Commonwealth agreement numbers for non-staff In-Kind have now been adjusted for years 2011-12 through to 2017-18, to better reflect anticipated contributions.

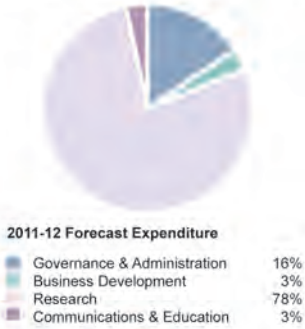
CRCSI FUNDING 2010-11	2010-11 Actual ($ '000s)		2011-12 Forecast ($ '000s)	
Funds (Cash)	4,039	Essential Participants	2,954	Essential Participants
	238	Other Participants	782	Other Participants
	3,674	CRC Program	4,002	CRC Program
	5,423	Commissioned Research/Other	300	Commissioned Research/Other
Total Income	**13,427**		**8,038**	

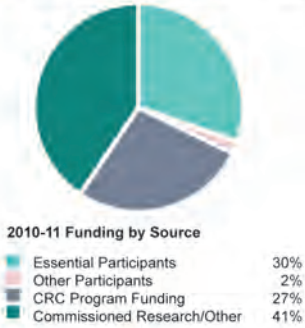
CRCSI EXPENDITURE 2010-11	2010-11 Actual ($ '000s)		2011-12 Forecast ($ '000s)	
Expenditure (Accrual)	1,662	Governance & Administration	2,076	Governance & Administration
	333	Business Development	438	Business Development
	3,861	Research Program	10,182	Research Program
	NIL	Communications & Education	423	Communications & Education
Total Expenditure	**5,856**		**13,119**	

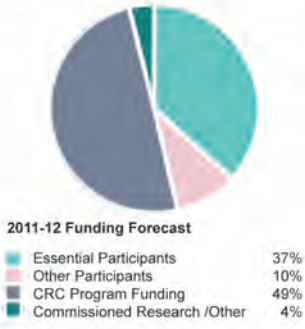
In-Kind Statement 2010-11	FTE Staff In-Kind				Non-staff In-Kind ($ '000s)			
	Actual	Agr'mt	Diff	Diff %	Actual	Agr'mt	Diff	Diff %
Research Program 1	6.0	3.9	2.1	53.8	206	605	-399	-66.0
Research Program 2	4.6	12.5	-7.9	-63.2	789	540	249	46.1
Research Program 3	2.9	2.6	0.3	11.5	1,282	245	1,037	423.2
Research Program 4	18.1	27.9	-9.8	-35.1	1,704	277	1,427	515.2
Total	**31.6**	**46.9**	**-15.3**	**-32.6**	**3,981**	**1,667**	**2,314**	**138.8**

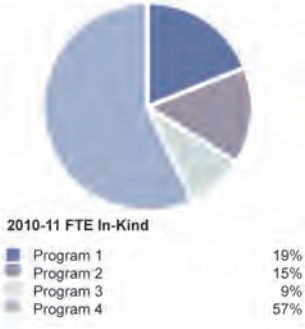
Cumulative Contributions	2010-11 Actual ($ '000s)	2011-12 Forecast ($ '000s)
Cash	13,427	8,038
FTE In-Kind	7,526	11,284
Non-Staff In-Kind	3,981	5,506
Total	**24,934**	**24,828**











Communications

The CRCSI has always placed a high value on its communications activities and relationships management. Our Communications Director oversees the following activities in a matrix management model with fellow CRCSI staff. A comprehensive communications plan is in place. The branding of the CRCSI has been refreshed and continues to build on the successful legacy of the first period of the CRCSI.

Relationships Management

An annual interview with key stakeholders is conducted and the individual Partner Engagement Plans prepared for each member are reviewed for performance and adjusted if necessary to take into consideration changing environments, expectations and drivers. This frank and full discussion allows the CRCSI to best understand and measure its performance in delivering satisfaction to its members, and craft a plan for the coming year's activities. These interviews and engagement plans also inform the strategic planning of the Board.

Communications (internal)

Effective internal strategise were planned in consultation as part of the formation of the new CRCSI and these have been implemented during the year. Put simply, these rely on Colleges to marshal the inputs from the different sectors within the CRCSI: Government, represented through the existing channels and structures of ANZLIC; Private Sector, organised through the award-winning 43pl structure; and Research and Education, organised through a new mechanism serviced by the CRCSI but driven by the College's "Essential Participants".

In addition, the CRCSI produces newsletters to update members on progress and reports from the Board and other governing bodies; conducts regular roadshows to foster good communication and participation in new initiatives, and to seek the views and engender enthusiastic support of participants in engaging in the CRCSI. The Commuications activities help projects in gaining new participants and in providing materials and training courses to disseminate information about and uptake of project outcomes. Participants are encouraged to attend the project progress review discussions conducted by teleconference each quarter.

The Annual Conference was held in November 2010 for 300 personnel from 100 organisations. Several international speakers provided cutting edge input and introduced some of the international links being planned by the CRCSI, particularly with Canada and China. Project leaders discussed their latest research and an open forum discussion tackled a number of important issues.

Special attention is paid to 43pl members, many of which are not accustomed to research-based interactions with academic and government institutions. The Communications Director has a role in providing confidential and impartial advice to 43pl members to assist their "CRCSI engagement".

Co-location of researchers and end-users and CRCSI management is encouraged: in Melbourne the CRCSI head-quarters are within the University of Melbourne. In Queensland, our Business Mananger is located within QUT and in New Zealand our New Zealand Director of Operations is located within Land Information New Zealand (LINZ).

Communications (internal and external)

A central website reports regularly on project progress, with blogs available for each project to encourage debate and enquiry. Project video presentations are made available. The website was overhauled and renewed in the period, and maintains a high level of traffic and download.

In addition to the webpage there are CRCSI pages on LinkedIn, Facebook, and Wikipedia, with associated discussion fora. In the coming years CRCSI will actively increase its use of twitter and related social media, while recognising that many of its users still rely on traditional communication channels.

CRCSI has modest exposure at conferences and symposia, preferring to deliver impact through project presentations rather than generalist booths and exhibits and sponsorships. Nonetheless we have been instrumental in the organisation and support of key events such as the spatial@gov conference; the Surveying Spatial Sciences Institute (SSSI) Spatial Sciences Symposium, the GITA conference, and the Spatial Industries Business Association of Australia (SIBA) national events; and several state based conferences eg the Western Australia Land Information System (WALIS) Forum.

Occasional media releases are prepared around significant CRCSI and project achievements, with an emphasis on the participants involved and recognition of the collaborative nature of the event.

Intellectual Property Management

The effective management and utilisation of intellectual property (IP) is fundamental to achieving the objectives set out in the Strategic Plan. CRCSI adheres to the following core principles of IP Management:

- the intention to facilitate rapid uptake (and capability) by end-user participants and stakeholders for national benefit
- innovative use of IP including partnering research providers having a 'free' licence to use the IP for their internal research purposes
- endeavouring to make a *priori* decisions about the commercial potential of investments in IP from the research. Where there is no commercial uptake (and no national security or privacy issues) then the IP will be put in the public domain
- operating an end-user uptake pathway with explicit emphasis on partnering SME's and government organisations, supported by the research providers. This will not operate to the detriment of CRCSI's large corporate participants
- Use of an Expression of Interest process to seek utilisation plans from CRCSI participants.
- Recognition of the substantial public benefits of the principle of open access
- Preferentially supporting end-user participants who have been active in research projects and who wish to utilise research outputs
- Exercising judgement at all times that maximises the collective benefit to the CRCSI as a whole

CRCSI Centre IP is any IP developed by the essential participants in carrying out the activities of the CRCSI (normally via project agreements). Centre IP is beneficially owned by the Essential Participants as tenants-in-common in proportion to their respective equity. The management of CRCSI Centre IP is the highest priority of the CRCSI.

Each Essential Participant has a non-exclusive, royalty-free licence to use Centre IP for the purposes of CRCSI activities and a non-exclusive, royalty-free, irrevocable right to use Centre IP to carry out internal research and development, and training or teaching.

The legal owner of Centre IP is Spatial Information Systems Research Ltd (SISR), who holds the IP on trust for CRCSI Participants. SISR is responsible for protecting, registering, patenting and utilising the Centre IP. SISR is the company that has been established as the holder and Utilisation agent of Centre IP, and is responsible for the Utilisation of Centre IP, including the marketing of the Centre IP, the seeking of potential licensees of the Centre IP, and the seeking other users of Centre IP for commercial purposes.

If SISR intends to utilise Centre IP it must advise each CRCSI Essential Participant in writing and identify the particular Centre IP and the terms of the proposed utilisation. Each Participant must within ten (10) working days of receipt of the notice advise SISR whether it desires to utilise or participate in the utilisation of the Centre IP. If no Participant desires to Commercialise then SISR is free to utilise the Centre IP.

No CRCSI Participant can commercialise, dispose of or encumber any interests which it might hold in Centre IP, except where authorised.

The CRCSI adopts the principle that researchers should be encouraged to actively participate in research and utilisation/commercialisation activities of the CRCSI and be rewarded for doing so. Accordingly, all financial incentives for researchers who are employees of participating organisations will be paid in accordance with the relevant policies and employment conditions of those organisations.

Centre IP Register

The intellectual property registers are a vital element in ensuring that information and methods generated by the CRCSI are recorded and where appropriate developed for commercial benefit. The CEO is responsible for maintaining a register of Centre IP.

The Centre IP Register serves to facilitate the use of new developments either by way of utilisation, or by contributing to other research activities within the Centre. It also provides a mechanism which helps to identify material which is the property of the Centre and should be treated as confidential, and to identify material which should be protected.

Each CRCSI researcher is obliged to disclose any invention that may have commercial potential. The onus is on the individual researcher to promptly communicate details of any Centre IP to the relevant Project Leader, who has the responsibility to communicate the notification to the CRCSI CEO.

The CRCSI IP Management Policy provides a framework for the CRCSI participants and researchers to permit the utilisation of research outcomes of the CRCSI. The policy sets out ownership rights and the responsibilities of researchers and participants. It provides guidance on the identification, protection and commercialisation of CRCSI IP. The policy is based upon the IP ownership and management principles outlined in the CRCSI Essential Participants Agreement and Commonwealth Agreement.

Current items being actively pursued and held on the register include:

Description	Pathway
Real Time Quality Control Software for Positioning	Under licence to project participants
Software and techniques for improved accuracy and range of RTK Positioning Systems'	Invention disclosure under review and evaluation.
Photogrammetric software for the generation of spatial information products from satellite imagery (Barista)	Continuing project and under licence to Project Participants
Software for the detection and measurement of ground surface movement using radar based remote sensing.	Licensed to UNSW (New South Innovations) for commercialisation
Aircraft guidance and path planning software	Under licence to CRCSI Participant
Spatial Information Exploration and Visualisation Environment (SIEVE) software	Continuing project and under licence to Project Participants
National Nested Grid Standard, Workflow Management System Software Platform and data model based on a grid cell (raster) approach for management of spatial information	Continuing project and under licence to CRCSI Participants
Health Software Spatial Augmentation Module for increased analytical and GIS capability	Continuing project and under licence to CRCSI Participants
Laser Scanning Segmentation Software (NN Clean)	Continuing CRCSI project
Terrestrial Laser Scanning Calibration Software	Under licence to CRCSI participants

Utilisation of Existing IP

There have been two significant developments during the period in relation to further Utilisation of IP:

'Business Process Improvement' at Ergon Energy.

This project was conducted in Queensland from 2007-2009 and in the final year, a specific piece of research was undertaken to investigate proof of concept techniques intended to improve the efficiency and effectiveness of powerline data capture from manned fixed wing aircraft. Preliminary results obtained at the project completion were encouraging. It was recognised however that substantial additional investment and commitment would be required to progress the proof of concept activity through to commercialisation. Ergon Energy have licenced the Centre IP to further this work.

Unlocking the LANDSAT archive for future challenges

CRCSI is a consortium member to the project entitled the Unlocking the LANDSAT archive for future challenges led by Lockheed Martin Australia. The project is funded by the Australian Space Research Program and the $3.4M initiative aims to build earth observation infrastructure to enable ongoing processing of the national LANDSAT imagery archive currently housed at Geoscience Australia. The infrastructure outcome from this initiative will be operationalised by Geoscience Australia and CRCSI underpins the developments contained within this initiative. This initiative will utilise CRCSI-1 Centre Intellectual Property created under Project 6.11: National Data Grid (NDG). Both of these CRCSI-1 projects have resulted in successful prototype installations in government partners and implementation of further instances of NDG is the next phase of development.

By securing of funding for the development of the LANDSAT archive through the Australian Space Research Program a significant opportunity for development of the archive will be possible. Fundamental to NDG success is its ability to establish itself as a defacto standard. Participation in this initiative will seed the uptake and strategically underpin the use of the technology through this large scale and high profile application in the Australian spatial marketplace and enhance future commercial opportunities beyond the life of the project.

Performance against Activities

Progress against the Key Challenge

The CRCSI-2 research program is designed to meet the strategic objectives for spatially enabling Australia that have been developed by the Australia and New Zealand Land Information Council (ANZLIC) representing federal, state and territory government agencies, and endorsed by industry.

Objective 1: To facilitate the research to enable the creation of a coordinated national network of satellite system reference stations to permit real-time positioning to 2cm accuracy.

The CRCSI, through its partners intends to conduct research to facilitate the creation of a coordinated national network of satellite system reference stations (to be known as the National Positioning Infrastructure) with real-time positioning of 2cm accuracy (in the 'x and y' dimensions and 6 cm accuracy in the 'z' dimension). This infrastructure and its services is to provide precise information on the positions of people, vehicles, built infrastructure and natural assets across the nation. Realising such a network requires substantial research (through CRCSI Program 1 Positioning) to optimise the use of existing and new reference stations, including the 75 positioning satellites being launched by Europe, Russia, China, Japan and India over the next five years.

Progress against this objective has been facilitated by the completion of project work from CRCSI-1 which will underpin the new research programs. Projects in Program 1 (listed in detail under Research) have contributed to this objective and form the foundation for the new body of research work, planned to commence in 2010-11.

Objective 2: To establish a fully functioning market place for spatial information.

The development of the 'Australia and New Zealand Spatial Marketplace' will enable government agencies to lift the licensing, governance and technical restrictions on providing the vast stores of government-held spatial data to the open market and to encourage other users to trade and value-add their data as well. The National Innovation Systems Review documents the huge benefits to Australia in unlocking access to these data. Industry strongly supports this objective and CRCSI-2 research (through CRCSI-2 Program 3 "Spatial Infrastructures") is required for its realisation.

Progress against this objective has been significant, largely through the completion of the Creative Commons Project (Project 3.05) and its resultant impact that has lead to the peak government body for spatial information, the Australia New Zealand Land Information Council (ANZLIC), agreeing in-principle to adopt a creative commons licencing regime. An Australia New Zealand Spatial Marketplace Steering Committee designed the specifications of the Marketplace and commenced a process to appointment an organisation to build the first demonstrator phase of the Marketplace.

Research

The reporting period has seen the majority of CRCSI-1 carry-over projects successfully completed and the initiation of a number of new CRCSI-2 projects. Table 1 summarises the status (as at 30 June 2011) of the carry over CRCSI-1 projects. Table 2 summarises the status of the newly approved CRCSI-2 projects. The research portfolio has now grown to include 13 internally funded projects, with a number of new project proposals at being developed for commencement in 2011-12. There is strong evidence of early progress. Three prominent examples include:

The Positioning Program will deliver new theories for the estimation and validation of GNSS carrier phase integer ambiguities. This new approach will underpin an equally new and novel method of multi-GNSS positioning that will deliver real-time, centimetre accurate locations on a national basis through a yet to be realised National Positioning Infrastructure.

Table 1 – Status as of 30 June 2011 of CRCSI-1 carry-over projects

CRCSI1 Projects Number	Title	Summary	Status
1.04	Integrating electricity, telecommunications and government infrastructure to deliver precise positioning services in regional areas	Milestoned within CRCSI-2. Some outcomes intended to transition to a new CRCSI-2 Project	Completed
1.06	LPI Professorial Fellow at UNSW	Funding allocated to support this position until December 2012	Continuing
1.12	Quality Control Issues for Real-Time Positioning	Milestoned within CRCSI-2. Some outcomes intended to transition to a new CRCSI-2 Project	Completed
1.13	Vertical Datum Harmonization Across the Littoral Zone	After detailed analysis, case study data proved inadequate to meet project needs	Terminated
1.14	Reconciling height datums in Australia: the bathymetric component	Successful project. No direct contribution to CRCSI-2	Completed
1.15	The Feasibility and Design of an Operational Real-Time GNSS CORS Analysis Capability for the Australian Region	Some outcomes intended to transition to a new CRCSI-2 Project	Completed
2.06	Automated analysis of terrestrial laser scanner in support of infrastructure asset management	Some outcomes intended to transition to a new CRCSI-2 Project	Completed
2.11	Automated Mapping & Feature Extraction from Space, Aerial & Terrestrial Imagery	Milestoned within CRCSI-2. Some outcomes intended to transition to a new CRCSI-2 Project	Completed
3.04	Landgate Professorial Fellow at Curtin University	On-going funding arrangements confirmed with project participants	Continuing
3.05	Enabling Real-Time Information Access in Both Urban and Regional Areas	Milestoned within CRCSI-2	Completed
4.09	New Technologies for Radar Interferometry	Successful project. No direct contribution to CRCSI-2	Completed
6.07	Spatial Information Business Improvement Applications at Ergon Energy	Milestoned within CRCSI-2. Some outcomes intended to transition to a new CRCSI-2 Project	Completed
6.08	Clever Cattle and Cropping Systems	Milestoned within CRCSI-2. Some outcomes intended to transition to new CRCSI-2 Project.	Completed
6.11	National Data Grid Project: Enhanced Platform for Environmental Modelling Support	Milestoned within CRCSI-2	Completed
6.12	Spatial Health Pilot Project	Some outcomes intended to transition to a new CRCSI-2 Project	Completed
6.13	Implementing Digital Licence Management in Queensland and Western Australia	Successful project. No direct contribution to CRCSI-2	Completed
6.14	Extension Activity Support sYstem (EASY) – Design and Demonstrator Development	Successful project. No direct contribution to CRCSI-2	Completed

Table 2 – Status as of 30 June 2011 of new CRCSI-2 projects

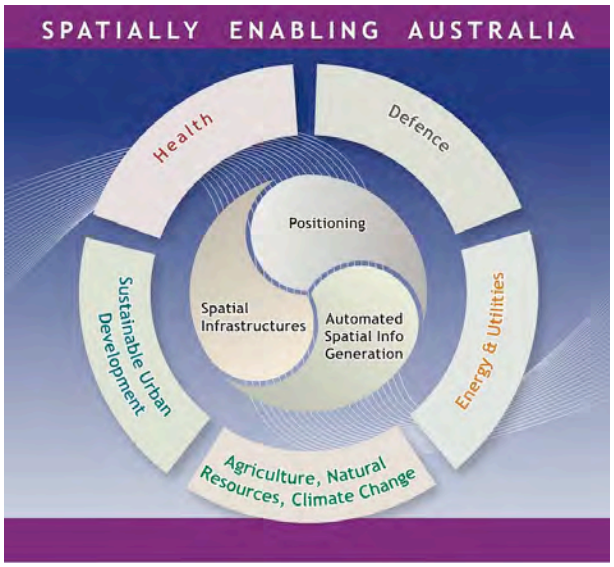
Project Number	Title	Start	Finish	Partners
1.01	New carrier phase processing strategies for achieving precise and reliable multi-satellite, multi-frequency GNSS/RNSS positioning in Australia	1 Jul 11	30 Jun 15	12
2.01	Multimodal data acquisition and feature extraction from multi-sensor terrestrial mobile mapping systems	1 Jan 11	31 Aug 14	13
2.02	Feature extraction from multi-source airborne and space-borne imaging and ranging data	1 Sep 10	30 Dec 14	14
2.07	Australian woody vegetation landscape feature generation from multi-source airborne and space-borne imaging and ranging data	1 Jul 11	30 Jun 14	4
3.05	Unlocking the LANDSAT archive for future challenges	1 Jan 11	31 Dec 12	5
3.06	Alignment analysis of spatial data supply chains for SDIs	1 Jul 11	30 Sep 11	2
4.12	Biomass business	1 Jul 10	30 Jun 14	11
4.15	Towards operational monitoring of key climate parameters from synthetic aperture radar	1 Jan 11	31 Dec 13	8
4.31	Enhanced flight assist system for automated aerial survey of powerline networks	1 Apr 11	31 Mar 14	2
4.41	Geovisualisation of health information	1 Jan 11	31 Dec 13	7
4.42	Spatial-temporal modelling of cancer incidence, survival and mortality	1 Apr 11	31 Mar 14	7
4.51	Greening the Greyfields – A spatial information platform for 21st century sustainable urban planning	1 Jul 10	30 June 14	6
9.07	Flight Assist System (FAS) Demonstrator	17 Jan 11	30 Apr 12	2

The 3D image concept will provide a framework for rigorously integrating multi-source imagery and ranging data for the purposes of extracting meaningful spatial information products using automated feature extraction technologies. CRCSI researchers have the opportunity to be the first to fully realise and document the 3D image concept as well as play an active role in the development of a data format for the delivery of 3D image data. The latter could result in the creation of an international industry standard.

Fundamental to health improvement is good evidence and information that can be acted on with immediacy and confidence. The CRCSI's Health Program is driving a revolution in health information dissemination with the recent release of the Health Tracks Reporting tool for testing by end users. The unique power of the tool for facilitating instant data access and supporting spatial analysis and visualisation of an extensive array of public health data is being seen first hand by the WA Health Department. Research outputs from the project, once tested, refined and expanded, will contribute to improved decision making and policy generation in the public health sector.

The research program also yielded 75 publications in 2010-11, including 26 in refereed journals and 26 in refereed conference publications. In addition there were 4 PhD completions with a further 20 postgraduates either continuing or commencing their candidature.

The research framework of CRCSI-2 is represented by the diagram below.



A number of high quality researchers were appointed to senior positions in the CRCSI including:

- Professor Peter Teunissen, Curtin University of Technology, to the position of Science Director Program 1 (Positioning). Prof Teunissen is a Federation Fellow and one of the worlds leading global navigation satellite systems researchers
- Professor Clive Fraser, Professiorial Fellow at the University of Melbourne, to the position of Science Director Program 2 (Automated Spatial Information Generation). Professor Fraser is one of the worlds leading photogrammetrists and metric remote sensing researchers
- Professor Kim Lowell, Professorial Fellow at the University of Melbourne, to the position of Science Director for Applications Program 4.1 (Agriculture Natural Resources and Climate Change). Professor Lowell is a world leading biometrician and spatial data accuracy expert.
- Professor James Semmens, Curtin University of Technology, to the position of Science Director Applications Program 4.4 (Health). Professor Semmens has an international reputation in health services research.
- Professor Peter Newman, Curtin University of Technology, to the position of Science Director Applications Program 4.5 (Sustainable Urban Development and Planning). Professor Newman is a globally recognised authority in sustainable cities research.

Research commentary

(a) Extent to which the CRC is on target to achieve its research outputs

Due to the need for substantive end-user engagement to define research directions and establish new research priorities, Programs 1 and 3 are off to a relatively slow start leading to minor delays in delivering early output milestones. The slow start is not expected to prevent all milestones being achieved, though some re-ordering and re-scheduling will be inevitable. These Programs are being driven by the end users and the commencement delays reflect the consultation stages required to generate user buy-in. It also reflects the large, complex and challenging nature of these programs in the context of Australia's experience in this industry.

(b) Key research achievements and evidence of the research quality

At this stage, most new projects have only been going for 3-6 months and so it is too early to expect substantial research achievements to be forthcoming. A number of research quality indicators, in addition to those captured for MDQ purposes, have been identified and are being monitored through the quarterly reporting process. Again at this early stage, it is too early to expect any substantial achievements to demonstrate research quality. Nonetheless, the quality of research is of paramount importance and will be the subject of on-going appraisal and continuous improvement.

(c) Any issues, including technical or scientific impediments

As mentioned under (a), it has taken longer than anticipated to initiate research in Programs 1 and 3. These delays have not been due to technical and scientific difficulties.

Rather the strong level of end-user interest and the complexity of the fundamental issues being addressed has created the need to better understand user needs and expectations and to build these requirements into the program design from the beginning.

(d) Level of end-user involvement and evidence the research is meeting end-user needs

As shown in Table 2, most new CRCSI projects have a significant number of end-user participants. These participants are invariably drawn from the academic, government and private sectors. Conclusive evidence to demonstrate that the research program is meeting end-user needs is not available at this early stage. However, we are encouraged by steady growth in participant numbers overall and by the growing interest from existing partners in recently funded projects. Moreover with the establishment of the Program Boards Chaired in each case by a lead end-user and dominated by end user members ensures that the research is designed to meet their needs.

(e) Any changes proposed to future research directions

At present there is no evidence to suggest that substantial changes in the research directions of the CRCSI will be required. This may change over time, particularly as the results from early research projects become available and begin to be implemented by end-users. The CRCSI will continue to be vigilant in evaluating the ongoing viability and relevance of current research directions and in the early identification of new research directions as these emerge.

Utilisation and Commercialisation

Utilisation of CRCSI Centre Intellectual Property

Spatial Information Systems Limited (SISR) is the legal owner of Centre Intellectual Property (CIP), with the beneficial rights of the property belonging to the Essential Participants of the Centre in proportion to the annual cash contributions. SISR is responsible for the commercialisation of CIP including marketing, seeking potential licensees and seeking other commercial applications.

If SISR intends to utilise any CIP, it must advise each CRC participant in writing and each participant has a period in which to express a desire to utilise or participate in the utilisation of the Centre Intellectual Property. Through the structure of 43pl, all of the SMEs involved can bid for commercialisation rights, as can any other participant in the CRCSI. If no participant desires to utilise the IP then SISR is free to utilise the CIP in the manner it sees fit.

Projects

The technology transfer and utilisation strategy is built into CRCSI proposals before the Board will approve CRCSI funding and enter into a project agreement. Criteria for project funding approval include a requirement that prospective utilisers and/or end users have significant involvement in the project. There must be a clear and credible route to industry application. Moreover the work plan has to reflect an appropriate degree of commercialisation capability and awareness.

Every project is governed by a project agreement which details intellectual property ownership, the proposed route to application, and the role to be played by the entities involved. All parties committing resources to the project sign the agreement. The agenda for the quarterly meetings of the Project Management Groups includes consideration of any potential commercialisation.

Where utilisation within a project is evident, the strategy is simple; identify potential technologies for utilisation early on through the project proposal process, develop a utilisation case with the guidance of the project management group, and prepare a case for the consideration of the Board. If approved implementation occurs through the CRCSI commercial agent, SISR. An expression of interest to develop the commercial proposition is then sought from CRCSI participants.

Key Utilisation Activities

The Board is guided by two principles when selecting organisations to lead the utilisation of CRCSI research outputs. Firstly preference is given to those participants who have played a lead role in the research and development phase. And secondly the outcomes of the utilisation must be in the overall best interests of all CRCSI partners. The strength of the business case presented for utilisation is a key factor in helping the Board with its final decision.

The utilisation activities for the period were restricted to those which built on development from CRCSI-1. Notable instances included:

Project 1.12

Quality Control Issues for Real-Time Positioning

Continued use by project partners including the Department of Sustainability and Environment (VIC), Landgate (WA), the Land and Property Information (NSW), and the Department of Environment and Resource Management (QLD).

Project 3.05.

Enabling Real-Time Information Access in Both Urban and Regional Areas

This project has raised significant awareness about Creative Commons licensing and has directly influenced a number of government agencies in Australia and New Zealand to adopt this approach to licensing spatial and other government information.

A central focus of Project 3.05 in CRCSI -1 was the further development and implementation of the Government Information Licensing Framework (GILF) which provides a simplified licensing scheme for access to and reuse of spatial (and other government) information.

The recently-launched AusGOAL project is based on GILF, taking it beyond Queensland with the intention that it can be used Australia-wide. Effectively, AusGOAL is GILF under a different name. Like GILF, it uses the Creative Commons licences and the Restrictive Licence template that was developed as part of the GILF project.

Project 6.11

National Data Grid Project: Enhanced Platform for Environmental Modelling Support

This project has been adopted by both Geoscience Australia and Department of Sustainability and Environment (VIC). In addition a $3.4M initiative funded by the Australian Space Research Program to build earth observation infrastructure to enable ongoing processing of the national LANDSAT imagery archive has commenced. It will utilise CRCSI Centre Intellectual Property created under Project 6.11: National Data Grid.

Project 6.12:

Spatial Health Pilot Project (HealthTracks)

The Department of Health (WA) has an active GIS Section in the Epidemiology Branch which spends a large proportion of its time preparing maps that depict health related data from internally held epidemiology systems. The Department wished to broaden the accessibility of such data by providing a web mapping application that could satisfy the major mapping requirements of public health staff and professionals. HealthTracks delivers this capability with increased clarity, time savings and efficiency increases, and in the more efficient use of time to the Department of Health (WA). Subsequent roll out of HealthTracks is planned for mental health, child health, environmental health, policy, country health service areas, and state-wide health planning.

Project 6.13

Implementing Digital Licence Management in Queensland and Western Australia.

In Queensland the Digital Licencing Management (DLM) software is being progressively implemented in Government agencies through the Government Information Service. Acceptance testing is underway in WA with implementation of a prototype DLM system to Government through Shared land Information Platform (SLIP) Enabler. The Project has also created increased awareness of DLM, and Creative Commons licencing and has emphasised the need for a whole of Government Information Licensing Framework.

Project 6.07:

'Business Process Improvement' at Ergon Energy

Optimised flight planning software which actively assists a pilot to fly an optimised flight path and maintain the aircraft orientation such that fixed assets remain within the field of view of the aircraft data capture hardware. Preliminary results obtained at the project completion were encouraging and have been licenced to an Essential Participant, Ergon Energy, to progress the proof of concept activity through to commercialisation.

HazWatch and MillMapper

Australian company iintegrate Systems Pty Ltd (www.iintegratesys.com) is commercialising IndjiWatch™, (http://www.indji.com/) a product based on "HazWatch" which was an outcome of one of the first round CRCSI projects. The Project Leader was from the end-user organisation Landgate (WA), and subsequently moved to the start-up company. IndjiWatch is a product for fully automated monitoring and analysis of natural hazard information and enterprise spatial information dissemination. The company provides software and online services that enable its customers to transform massive amounts of real-time, location-based data into valuable, targeted information. The IndjiWatch online service currently watches hundreds of thousands of miles of the interconnected electricity network throught all of eastern Australia from Queensland to Tasmania. It also operates in the USA and Canada. IndjiWatch assesses the impact of over twenty million natural phenomenon events, such as lighting strikes per month.

The company expanded into the US in late 2009 to target sales into the energy sector, however following a significant contraction of power generation revenues the US operation is now run from Australia. iintegrate Systems continues to maintain its product with Australian and US energy customers.

Scanalyse Pty Ltd (http://www.scanalyse.com.au/), a spin out company of CRCSI-1 funded research now employs 18 people. Scanalyse Pty Ltd specialises in products and services providing mineral processing operations with sophisticated wear and performance management tools. The Company has targeted applications where overall site productivity and efficiency are directly impacted by the extent and quality of condition monitoring information.

MillMapper™, the company's first commercial product release was a world first and has international patent protection. MillMapper is a three-dimensional laser scanning and modelling technology and service for monitoring rates of wear in milling and other mining operations. It reduces maintenance costs, increases productivity, improves safety and offers greenhouse savings in the energy-intensive operations. It represents a quantum leap in the in-situ measurement, modelling and management of grinding mill liners and grinding media. Now established and operating on mine sites around the world, this technology has become standard operating practice in all progressive mine site milling applications. Operators are now able to make decisions based on solid measurement data and robust analyses.

Based in Perth, Western Australia, Scanalyse has operations in Australia, and North and South America that offer the full services of the Scanalyse brand.

Education and Training

Progress was significant with nine students commencing with either full or top-up Scholarships, bringing the total cohort of continuing and commencing students to 20. The new students joined the several whose term commenced in the first period of the CRCSI. Details and updates are maintained at the education page (http://www.crcsi.com.au/Education/Students-List), as is a listing of our "alumni" (http://www.crcsi.com.au/Education/alumni) who now work across the globe in many industry sectors. In addition four students completed their studies.

Students are involved in all major projects. Each student is required to have an external end-user superviser. Students are all invited to attend the annual CRCSI

conference which has a specific session for students. We are on target to achieve planned outputs from the education program.

In addition a number of workshops were held to inform the planning of CRCSI programs, and to explore and promote collaboration. For instance an open workshop attended by 75 senior industry, government and academic leaders was held in Wellington to promote collaborative activities, with a view to growing the New Zealand participation. Another example is Program 3 which has held several workshops attended by some 200 people over the year to debate future directions.

The coming year will see more of these exploratory workshops as well as a growing number of program and project based information sessions on technology and opportunity developments

SME Engagement

SMEs are integrated into the CRCSI's activities. The CRCSI has a unique structure for its SME consortium: members purchase units in a unit trust (43pl) through which each can participate in the CRCSI with appropriate flexibility. A resourced set of strategies to engage with these companies is implemented through the Communications Director position. New members of 43pl are encouraged.

43pl is an Essential Participant in the CRC. The proprietary limited company brings together the SME companies through a unit trust deed. Each SME is a unit trust holder. A company from each jurisdictional area provides a Director for the Board of 43pl. Board directors come from each jurisdiction involved in the CRCSI to aid communication channels. At 30 June 2011 the 43pl Directors were Tony Wheeler (Independent Chair), Jack de Lange (Queensland), Jim Curnow (SA and NT), Chris Earls (WA), Ed Garvin (NSW & ACT), Rob Rowell (Tasmania and Victoria) and Simon Jellie (International).

The CRCSI provides finance, administration and communications functions to the company and its board of directors. The consortium is a major platform for the CRCSI to achieve industrial development and growth of the spatial industry, which is a core outcome of the CRCSI and enunciated in the Strategic Plan.

The 43pl value proposition includes (but is not restricted to):

- Access to R&D initiatives and IP for commercialisation
- Growing the business (technical, professional development)
- Skills development and capacity building including the recruitment of CRCSI post-graduate students
- Meaningful networking into government & academia
- Market development; kudos
- Neutral ground to meet clients and suppliers

Membership of 43pl has grown since inception to 56 companies.

Collaboration

Research Collaborations

CRCSI has many participants across Australia. Approximately 59 companies had formal collaborative arrangements with CRCSI activities in the period, along with over a dozen government departments and a similar number of universities.

Respective organisational cultures differ between the various government agencies, small service provider companies and manufacturers, R&D based enterprises, and universities, and these differences are well managed by the CRCSI when judged by the number of organisations prepared to participate. Fostering a CRCSI culture of excellence in cooperation is important to the Board and Management. CRCSI is above all a collaborative enterprise and this is practiced in various ways, as described below.

Internal

The CRCSI has achieved significant progress in developing collaborative linkages within the CRCSI.

The CRCSI is vertically integrated in that leading edge customers are engaged with technology and service providers. In addition many of the customers are also suppliers of the data and infrastructure used by the market in devising new products.

Cooperation amongst geographically spread activities and entities is assisted through regular electronic and physical symposia.

Cooperation with Other CRCs

Cooperative arrangements with other CRCs are selectively sought where resources allow and mutual interest is found. Relationships exist with the Bushfires CRC, and Remote Economic Participant CRC amongst others.

National (http://www.crcsi.com.au/Partners)

Strong links have been established with key stakeholder groups, notably the peak industry body the Spatial Industries Business Association (SIBA), the peak professional body the Surveying and Spatial Sciences Institute (SSSI) and the peak government body ANZLIC – the Spatial Information Council. Mechanisms include board invitations, joint board meetings, membership, committee representation, and invited presentations, shared web links, and collaborations on important initiatives such as the national Spatial Education Advisory Committee; leadership roles within the NCRIS AuScope and related activities; and the commissioning of joint projects. These relationships are important to give strategic advice and context to the CRCSI on the one hand and on the other to effectively convey the work of the CRCSI to the broader spatial end user communities.

International (http://www.crcsi.com.au/Partners)

International collaborative alliances were maintained during the period with strategic advantage sought for specific projects. The following international links are being actively pursued for strategic reasons and to provide net benefit to our equity partners:

- New Zealand – the CRCSI is in the process of establishing a full bi-lateral parternship with New Zealand through Land Information New Zealand (LINZ), the University of Canterbury and four 43pl members. The CRCSI opened an office in Wellington this year and is actively pursuing collaboration with new agencies and organisations in the region.
- Tecterra – of Canada which “creates economic value for Canada through investment in geomatics technology solutions for various resource sectors and geospatial information management applications.”
- GEOIDE Network - based at the University of Laval in Quebec, Canada (analogous to the CRCSI, funded as a Canadian ‘Network of Centres of Excellence’ (http://www.geoide.ulaval.ca).
- Chinese Academy of Sciences (CAS) - A collaborative research agreement underpins joint activities that are being developed, in particular through CAS’s Centre for Earth Observation and Digital Earth (CEODE)
- Global “Network for networks” of which the CRCSI is a founding member. This new organisation has five founding members together with the CRCSI: Canada (GEOIDE), South Korea (Korean Land Spatialization Group), Mexico (Centro-Geo), Sweden (Future Position X) and three affiliate partners; Ireland (National Centre for Geocomputation), European Union (AGILE) and the US (UCGIS).

End-users are involved in all aspects of the CRCSI. Meaningful SME engagement is a particular strength of CRCSI and is reflected in all aspects of the CRC operation.

Other Activities

The Urban Digital Elevation Model Project and Development of a National Elevation Data Framework

Australia's coastal zone is highly vulnerable to likely impacts of climate change due to the concentration of Australia's population, and our natural and built assets in coastal areas. Around 85 per cent of our population lives within 50 kms of the coast.

Minister for Climate Chamge and Energy Efficiency the Hon Greg Combet AM second from left with Professor Bruce Thom AM, Dr Peter Woodgate CEO CRCSI and Dr Andrew Ash CSIRO in Newcastle at the launch of the products of the first phase of the DEM work.

In Australia, national, state and local governments are concerned about the risks and costs associated with potential damage to housing, infrastructure and natural ecosystems in vulnerable coastal areas. There is growing demand across all spheres of government for a much improved toolset to quantitatively assess the risks to infrastructure, communities and natural systems from coastal inundation and other impacts as a result of projected climate change. A key impediment has been the absence of high-resolution elevation data that enables government to effectively assess climate change risks and adequately inform investment decisions and adaptation efforts.

The DCCEE commissioned this work to acquire ground surface topography data to spatially assess the possible impact of inundation due to climate change. Key areas mapped were Perth, Melbourne, Sydney, NSW Central Coast, Adelaide, Brisbane, Gold Coast and Darwin. Over 20,000 km2 of elevation data were acquired and data licensing negotiated for data to ensure on-going access across all levels of government for non-commercial public good use.

High resolution digital elevation models (DEMs) were developed and hydrologically conditioned to optimise coastal inundation modelling. Inundation layers at 20cm intervals were developed for each area up to 4m of elevation and thereafter at 1m intervals up to 10m and these provided key inputs into two further products: (1) the web-based Sea Level Rise Visualisation tool which provides an easy interface for users to display the inundation layers over imagery and (2) static sea level rise maps that identify low-lying areas that are vulnerable to the impacts of climate change. The maps highlight areas of Australia's coast vulnerable to a low, medium and high sea level rise scenarios and were developed to help engage with communities about the implications of coastal climate change (available at http://www.ozcoasts.org.au/climate/sd_visual.jsp).

Minister for Climate Change and Energy Efficiency the Hon Greg Combet AM at the launch of the Digital Elevation Mapping work in Newcastle.

A web portal was also developed to provide access for government and public good use to the wide range of acquired digital elevation data and derived products. The portal allows users to search, discover, view, licence and take delivery of elevation and related data products. The portal not only provides a platform for improved data discovery and access, but will also significantly improve the management and maintenance of elevation and related data within and across government (nedf.ga.gov.au).

The outcomes significantly improve the capacity of government to assess climate change risks in the coastal zone in high priority urban areas. They also make a significant contribution to developing the National Elevation Data Framework which will guide future government investment in elevation data.

Products and outputs from the project were publicly released by Minister Combet on 15 December 2010 and 19 May 2011.

International Forest Carbon Initiative (IFCI)

An initiative of the Department of Climate Change and Engery Efficiency (DCCEE), the IFCI forms a key part of Australia's leadership in reducing emissions from deforestation and forest degradation in developing countries (REDD). A critical component of the IFCI is the development of a global carbon monitoring system (GCMS) that has the capability to use advanced satellite

Example of forest cover types in Tasmania

Example of forest cover types in Tasmania

imaging using radar and optical sensors to measure rates of deforestation and forest degradation by monitoring, reporting and verifying (MRV) emissions of greenhouse gases. The GCMS will form a global network of compatible national forest monitoring and reporting systems that meet national reporting requirements, and can potentially be linked to support domestic and international carbon trading initiatives. Through the IFCI, the Australian Government is providing expert advice and assistance to developing countries on MRV issues. The CRCSI will assist to pool and coordinate the body of expertise in Australia to support these training, advice and assistance roles. To progress this objective it is necessary to complete the following:

- Secure unencumbered access to adequate and cost-effective satellite data
- Ensure interoperability of earth observation satellite sensor technologies
- Produce accepted accuracy assessments of remote sensing and ground monitoring products
- Link remote sensing and ground forest data and models to provide emissions estimating tools

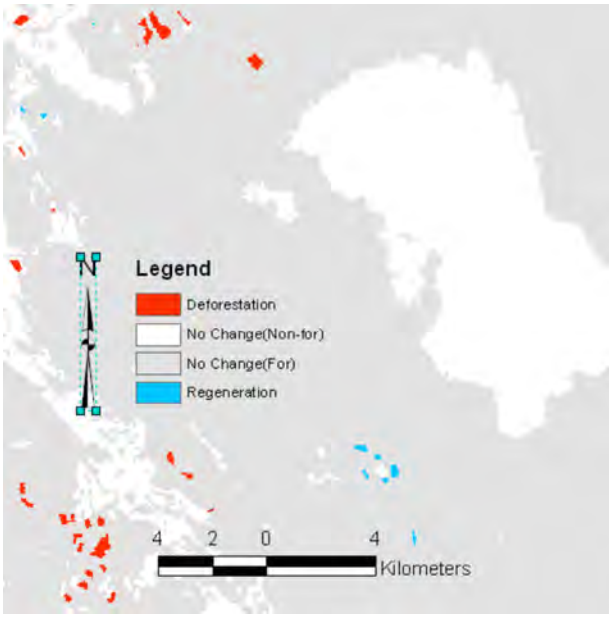
To cost-effectively achieve these objectives at an international level, the Department of Climate Change and Energy Efficiency on behalf of Australia is working through the intergovernmental Group on Earth Observations (GEO) and the Committee on Earth Observation Satellites (CEOS). Under GEO, Australia, Norway and Japan are

co-leads on a Forest Mapping and Tracking Program that aims to demonstrate a robust forest observations capability. As part of Australia's contributions to this effort, Australia nominated Tasmania as one of the global reference and demonstration sites. The demonstration site will show through practical demonstration that the above four objectives can be met, thereby influencing post 2012 climate change negotiations by demonstrating ongoing technical improvement to a globally applicable.

The IFCI project was commissioned by DCCEE in 2009. It is a joint venture with CSIRO.

The IFCI project has:

- Evaluated the feasibility of using optical and radar imagery interchangeably in the same carbon monitoring system.
- Established concepts and demonstrated results of different accuracy assessment procedures for single data Forest/Non-forest maps and multi-temporal maps showing deforestation and regeneration.
- Authored a GEO Forest Carbon Tracking guide on accuracy assessment of remote sensing products.
- Provided training in image processing for carbon accounting.
- Maintained a strong international presence by contributing to the GEO Forest Carbon Tracking task in the areas of image processing and accuracy assessment.
- Contributed research into the ongoing use of emerging remote sensing-derived biophysical parameters for improved forest characterization (forest type, structure, biomass, function), and identification of forest disturbance and degradation events.



Land cover change maps from radar imagery showing derived differences in Deforestation (red) and Regeneration (blue) over a 2 year period.

On-ground data collection by project personnel in Tasmania.

Kokoda Project

In 2008, Australia and Papua New Guinea committed to cooperate and work together for the protection and sustainable use of the natural and cultural resources of the Owen Stanley Ranges region including the Kokoda Track.

The Australian Department of the Environment, Water, Heritage and the Arts (DEWHA) is assisting PNG to undertake a number of land use and protection projects. This is a "whole of government initiative" and the PNG Department of Environment and Conservation (DEC), with DEWHA's assistance, is currently developing spatial systems and databases to support the land-use planning requirements of the Kokoda Initiative and development of a Sustainable Development Masterplan for the Brown River Catchment, Kokoda Track and Owen Stanley Ranges region.

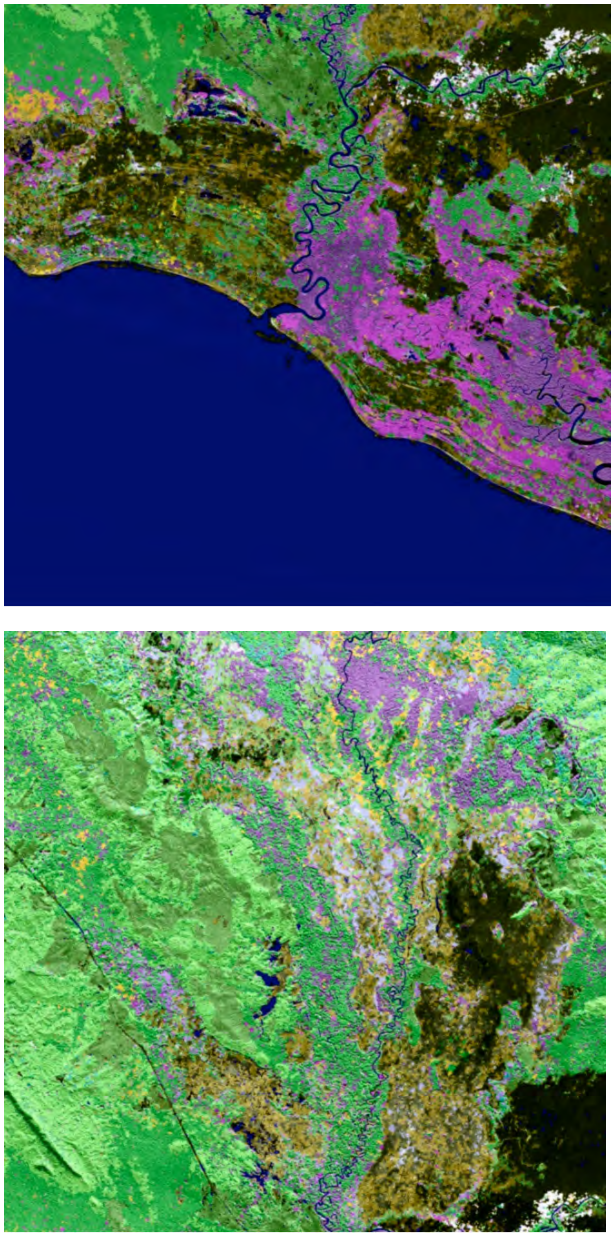
The Australian Kokoda Taskforce and PNG National Taskforce identified three critical datasets as requirements for the land use planning work for the Kokoda Initiative:

1. High Resolution Digital Elevation Model (DEM) for use in deriving key terrain attributes such as slope, aspect, drainage and susceptibility to erosion
2. Current land use maps for delineating the Kokoda Track and broader heritage values and Interim Protection Zone
3. Forest cover change and biomass assessment

CRCSI is assisting to develop these key data sets through the provision of high spatial resolution, digital elevation data for slope analysis, drainage delineation and flood modelling using Earthdata aerial GeoSAR and satellite PALSAR data. These datasets were required to assess the suitability of the Owen-Stanley Ranges and adjacent high-relief hills and foothills for logging, susceptibility of the cleared landscape to erosion, line of site visualisation and to assess the suitability of these areas for different land uses.

Land cover mapping is also possible using the combined GeoSAR data set, which included P-band and X-band radar imagery, and in which land cover types, such as forest, plantations and crops, mangroves, clearings and disturbed areas could be readily distinguished.

A ground data campaign is planned for accuracy assessment and validation of the full land cover classification and for biomass estimation.



Land cover classification in Papua New Guinea.

Flood mapping images for national disaster response effort

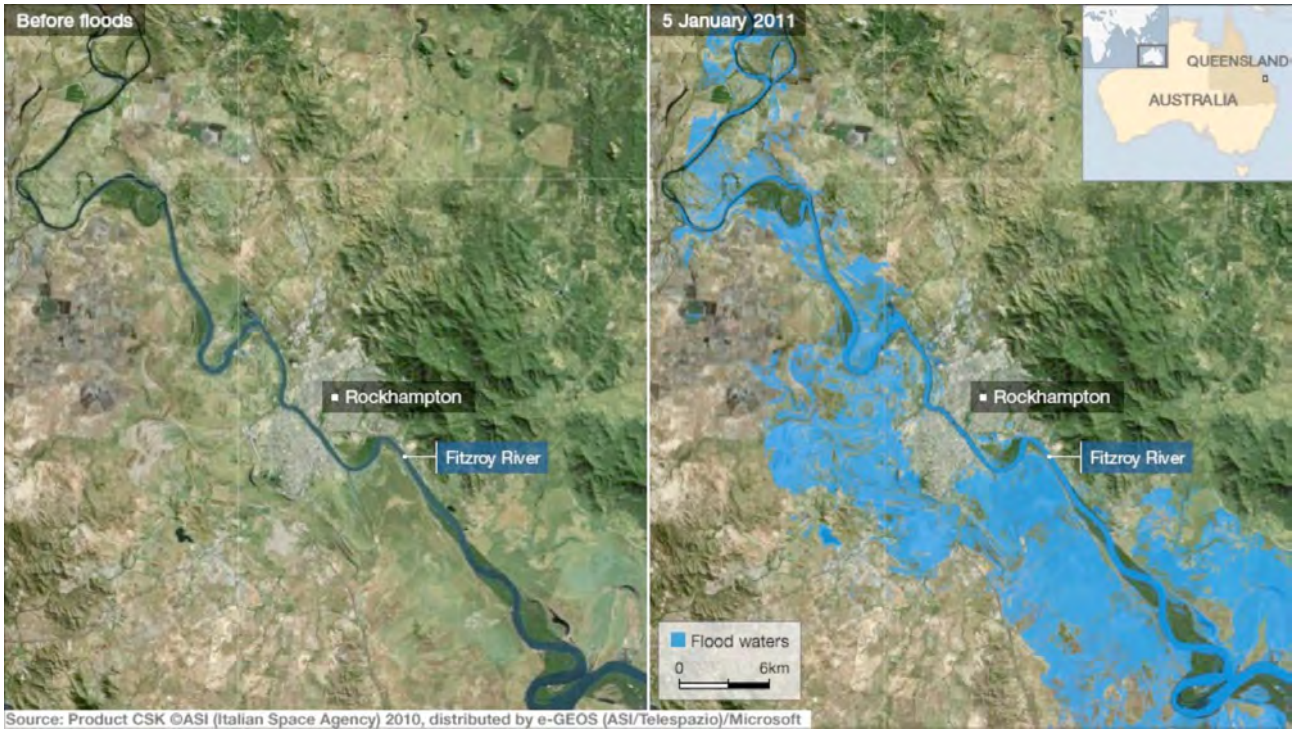
During the Dec 2010 – Feb 2011 disasters (floods and Cyclone Yasi), CRCSI helped coordinate a national response for mapping products from the international community. The CRCSI also assisted the University of New South Wales to provide high quality images of the floods across four states; Queensland, Victoria, New South Wales and Western Australia, using radar imagery from the constellation of four Italian satellites. Satellite reception and pre-processing was done in Europe with local enhancements performed in Australia.

Associate Professor Linlin Ge and his team at the University of New South Wales, who are jointly funded by CRCSI, the University of NSW and the Land & Property Information (LPI) of the Department of Finance and Services (NSW) worked tirelessly from December 2010 to March 2011 (beginning with work for the NSW State Emergency Service) to coordinate the production of high quality images of the floods across four states.

The radar satellite signals, which can penetrate clouds and are uniformly reflected by floodwater, come from a constellation of four Italian Cosmo-SkyMed satellites. Satellite reception and pre-processing was performed in Europe and local enhancements conducted in Australia by the CRCSI/UNSW team.

The images allow tracking of flood waters and of flood stricken areas and have been so vital for state emergency agencies and response planning authorities that a temporary mobile Cosmo-SkyMed satellite reception and processing facility was been installed on LPI property at Bathurst. The mobile facility enabled local receipt of satellite imagery for local processing. The facility enabled image turnaround times from around eight hours (via Europe) to about two hours locally.

In order to coordinate this complex analysis and mapping activity, the CRCSI has brought together federal and state authorities, the Department of Environment and Resource Management (QLD), LPI, Department of Innovation, Industry Science and Research (DIISR) through the Space Policy Unit, Geoscience Australia, Department of Sustainability and Environment (VIC), and



Images showing the impact of flood waters on the town of Rockhampton, Queensland, Australia - taken on 5 January, when the Fitzroy River was at its peak level of 9.2m. The flood image was created using radar data from the Cosmo-SkyMed satellite constellation, operated by the Italian Space Agency, e-GEOS.

Landgate (WA), to participate in the ongoing operational trial of this system and its imagery products.

2010-11 Short term Commissioned CRCSI Research projects

A number of short term projects were undertaken at request of partners.

Economic value of Earth observation from Space

A study for Geoscience Australia to determine the economic value of space based Earth observation activities to Australia in the 2008-09 financial year was conducted through the CRCSI. This study will inform the development of a National Space Policy for Australia. It can be found at www.ga.gov.au/image cache/GA18454.pdf

Satellite Hotspot Detection

Existing hotspot detection systems such as Sentinel (sentinel.ga.gov.au) are an integral part of the bushfire planning and response strategies for all the State and Federal emergency management agencies. In rapidly evolving emergency situations there is a pressing need for more frequent information about the location and intensity of the bushfires than that provided by current optical satellites. Thermal data acquired by geostationary satellites is updated on an hourly basis, and the project examined the hotspot detection capabilities of thermal data acquired by geostationary satellites.

Review of Change Monitoring program

CRCSI provided a review of one agency's vegetation change monitoring and compliance program.

Rapid Site assessment

CRCSI performed a rapid assessment of airborne radar data to identify priority areas of low elevation coastal settlements and infrastructure to inform the location of LiDAR surveys and inundation modeling.

Positioning Policy

CRCSI assisted with the development of recommendations on the scope of a national positioning policy, including recommendations on the sectors and agencies that should be consulted with in the development of a national policy.

Literature Review

CRCSI assisted with the review of international published literature on visualisation of climate change and landscape planning scenarios.

Health Data Analysis

CRCSI assisted to provide data analysis and advice in relation to the mapping of health data.

Glossary and Acronyms

43pl	43 Version 2 Pty Ltd, a company representing the CRCSI's SME consortium
ACC	Audit & Compliance Committee
ANZLIC	ANZLIC - the Spatial Information Council formerly known as the Australia and New Zealand Land Information Council
ARGN	Australian Regional GPS Network
SIBA	Spatial Industries Business Association
ASC	Australian Spatial Consortium
CEODE	Centre for Earth Observation and Digital Earth
CORS	Continuously Operating Reference Station
CRC	Cooperative Research Centre
CRC Program	Secretariat of the DIISR CRC Program
CRCSI	Cooperative Research Centre for Spatial Information
CRCSI-2	Name given to the 2nd phase of the CRCSI 2010-2018
DEM	Digital Elevation Model
DInSAR	Differential Interferometric Synthetic Aperture Radar
DIISR	Commonwealth Department of Innovation, Industry, Science & Research
GFI	Global Forests Initiative
GIS	Geographical Information Systems
G-NAF	Geocoded National Address File
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
IACC	Industry Advisory & Commercialisation Committee of the CRCSI-1
INS	Inertial Navigation Systems
InSar Radar	Interferometric Synthetic Aperture
MOU	Memorandum of Understanding
NfN	Network for Networks – an international consortium of CRCSI-like organisations
PSInSAR	Permanent Scatter Interferometric Synthetic Aperture Radar
REAC	Research & Education Advisory Committee of the CRCSI-1
Round 11	The 2009 CRC Program Funding Round
SDI	Spatial Data Infrastructure
SEAC of	Spatial Education Advisory Committee Australia
SISR	Spatial Information Systems Research Ltd
SME	Small to Medium [sized] Enterprises
SSSI	Surveying & Spatial Sciences Institute

CRCSI[3] Participant's 2010-11			
Participant's Name	**Participant Type**	**ABN or ACN**	**Organisation Type**
43 Version 2 Pty Ltd	Essential	95 140 787 971	Industry / Private Sector
Curtin University of Technology	Essential	99 143 842 569	University
Department of Environment and Resource Management (QLD)	Essential	46 640 294 485	State Government
Ergon Energy Corporation Limited	Essential	50 087 646 062	Industry / Private Sector
Geoscience Australia	Essential	80 091 799 039	Australian Government
Land and Property Management Authority (NSW), now known as Land and Property Information (LPI) of the Department of Finance and Services, (NSW)	Essential	33 537 762 019	State Government
Landgate, (WA)	Essential	86 574 793 858	State Government
Queensland University of Technology	Essential	83 791 724 622	University
The University of New England	Essential	75 792 454 315	University
University of Canterbury	Essential	N/A	University
University of Melbourne	Essential	84 002 705 224	University
Department of Sustainability and Environment, (VIC)	Essential	90 719 052 204	State Government
Defence Imagery and Geospatial Organisation	Other	68 706 814 312	Australian Government
Department of Health, (WA)	Other	13 993 250 709	State Government
GEOIDE (Inc), Canada	Other	N/A	International
Land Information New Zealand	Other	N/A	International
Department of Environment Climate Change & Water, (NSW)	Other	30 841 387 271	State Government
Royal Melbourne Institute of Technology University	Other	49 781 030 034	University
Spatial Information Systems Limited	Other	78 106 799 053	Industry/Private Sector
Swinburne University of Technology	Other	13 628 586 699	University
Telethon Institute for Child Health Research, (WA)	Other	86 009 278 755	State Government
Western Australian Agricultural Authority	Other	86 611 226 341	State Government
AAM Pty Ltd	43pl	63 106 160 678	Industry / Private Sector
AgLab	43pl	50 114 847 460	Industry / Private Sector
Akuna Consulting	43pl	42 861 310 387	Industry / Private Sector
Alexander Symonds Pty Ltd	43pl	93 007 753 988	Industry / Private Sector
Brazier Motti Pty Ltd	43pl	58 066 411 041	Industry / Private Sector
Brown & Pluthero Pty Ltd	43pl	55 010 117 236	Industry / Private Sector
C R Kennedy & Co Pty Ltd	43pl	50 008 458 884	Industry / Private Sector
Clyde Agriculture Pty Ltd	43pl	96 000 347 259	Industry / Private Sector
Costa Property Group Pty Ltd	43pl	72 534 822 931	Industry / Private Sector
Critchlow Limited	43pl	N/A	Industry / Private Sector
CNG Systems Pty Ltd	43pl	89 117 511 261	Industry / Private Sector
CTF Solutions Pty Ltd	43pl	82 144 513 459	Industry / Private Sector
CTG Consulting Pty Ltd	43pl	24 100 876 015	Industry / Private Sector
Eco Logical Australia Pty Ltd	43pl	87 096 512 088	Industry / Private Sector
ERDAS Pty Ltd	43pl	39 091 162 195	Industry / Private Sector
e-Spatial Ltd	43pl	N/A	Industry / Private Sector

CRCSI Participant's 2010-11 - continued			
Participant's Name	**Participant Type**	**ABN or ACN**	**Organisation Type**
ESRI Australia	43pl	16 008 852 775	Industry / Private Sector
FBA - Fitzroy Basin Association	43pl	30 802 469 401	Industry / Private Sector
Fugro Spatial Solutions Pty Ltd	43pl	52 008 673 916	Industry / Private Sector
Fusion GIS	43pl	92 105 274 226	Industry / Private Sector
GeoSmart Maps Ltd	43pl	N/A	Industry / Private Sector
Geoimage Pty Ltd	43pl	75 010 840 294	Industry / Private Sector
Geomatic Technologies Pty Ltd	43pl	41 081 782 863	Industry / Private Sector
Geometry Pty Ltd	43pl	35 094 569 507	Industry / Private Sector
GPSat Systems Australia Pty Ltd	43pl	47 056 077 902	Industry / Private Sector
Hames Sharley (WA) Pty Ltd	43pl	42 009 073 563	Industry / Private Sector
iintegrate Systems Pty Ltd	43pl	48 111 015 297	Industry / Private Sector
Insight GIS	43pl	80 059 212 798	Industry / Private Sector
Land Equity International Pty Ltd	43pl	42 097 054 165	Industry / Private Sector
Lester Franks Survey & Geographic Pty Ltd	43pl	25 098 991 210	Industry / Private Sector
LISASoft Pty Ltd	43pl	93 064 935 011	Industry / Private Sector
McMullen Nolan & Partners Pty Ltd	43pl	90 009 363 311	Industry / Private Sector
Mercury Project Solutions Pty Ltd	43pl	57 141 118 194	Industry / Private Sector
Milne Agricultural Group	43pl	92 008 919 579	Industry / Private Sector
NGIS Australia Pty Ltd	43pl	56 061 264 793	Industry / Private Sector
Omnilink Pty Ltd	43pl	80 056 793 723	Industry / Private Sector
OmniStar Pty Ltd	43pl	50 009 300 761	Industry / Private Sector
Photomapping Services Pty Ltd	43pl	30 005 552 876	Industry / Private Sector
PSMA Australia Ltd	43pl	23 089 912 710	Industry / Private Sector
Scanalyse Pty Ltd	43pl	63 117 523 369	Industry / Private Sector
Septentrio Satellite Navigation	43pl	N/A	Industry / Private Sector
Sinclair Knight Merz Pty Ltd	43pl	37 001 024 095	Industry / Private Sector
SkyView Solutions	43pl	28 935 370 298	Industry / Private Sector
Spatial Information Technology Enterprises Ltd	43pl	49 085 230 173	Industry / Private Sector
Spatial Vision Innovations Pty Ltd	43pl	28 092 695 951	Industry / Private Sector
Sundown Pastoral Company	43pl	86 000 334 190	Industry / Private Sector
Superair	43pl	25 990 899 338	Industry / Private Sector
Terranean Mapping Technologies Pty Ltd	43pl	52 113 485 475	Industry / Private Sector
ThinkSpatial	43pl	65 711 887 042	Industry / Private Sector
Trimble Navigation Australia Pty Ltd	43pl	23 057 599 881	Industry / Private Sector
True 3D	43pl	96 486 268 410	Industry / Private Sector
Twynam Investments	43pl	12 000 573 213	Industry / Private Sector
Vekta Pty Ltd	43pl	41 138 024 754	Industry / Private Sector
VPAC Ltd	43pl	59 093 732 426	Industry / Private Sector
we-do-IT Pty Ltd	43pl	26 071 972 891	Industry / Private Sector
Whelans (WA) Pty Ltd	43pl	68 074 363 741	Industry / Private Sector

CRCSI Participant's 2010-11 - continued			
Participant's Name	**Participant Type**	**ABN or ACN**	**Organisation Type**
Monash University	Third Party	12 377 614 012	University
Cancer Council (QLD)	Third Party	48 321 126 727	State Government
University of New South Wales	Third Party	57 195 873 179	University
City of Canning	Third Party	80 227 965 466	State Government
Flinders University	Third Party	65 542 596 200	University
Department of Planning (WA)	Third Party	79 051 750 680	State Government
Department of Climate Change and Energy Efficiency	Third Party	50 182 626 845	Australian Government
Victorian Health Promotion Foundation	Third Party	20 734 406 352	State Government
Department of Justice (VIC)	Third Party	32 790 228 959	State Government
PNG Department of Environment and Conservation	Third Party	N/A	International
Department of Primary Industries (VIC)	Third Party	42 579 412 233	State Government

[3]This list comprises organisations that have executed a formal Commonwealth Participants agreement with the CRCSI. There a many other partners who are unable to execute this agreement but are participating on the basis of an exchange of letters.