



# PROGRAM HANDBOOK

Spatial Information Day  
2010

13 August 2010  
ADELAIDE CONVENTION CENTRE | SOUTH AUSTRALIA



# Welcome

It is with great pleasure that the Spatial Information Day Committee welcomes you to our 2010 event.

This year we have assembled what we believe to be the best program yet, with national and international keynote speakers, and concurrent streams addressing a wide range of interest areas from water and environmental management to community development, surveying and Business Intelligence.

Support from our sponsor partners has been unprecedented, and we are excited to offer you a bigger and more interactive exhibition showcasing the latest in technology developments.

We have expanded the reach of the event in 2010, incorporating a Students and Teachers stream to inspire and involve those who might be future leaders in our industry. In 2010 we will also take a look at ourselves and debate whether 'Spatial is Special' in our inaugural Great Debate.

It is a testament to the success of the spatial industry in South Australia that the event continues to grow; so learn, discover, enjoy spending time with your peers, and savour the success of which you are a part.

Penny Baldock



## Sponsors

### Platinum



### Gold



### Silver



### Supported by



# SID2010 Conference Program

## MORNING

8:30 - 9:00am	REGISTRATION			
	Hall B & C (Chair: John O'Malley)			
9:15 - 9:30am	OFFICIAL OPENING Gypsy Bhalla - SSSI Incoming President Platinum Sponsor Address			
9:30 - 10:00am	KEYNOTE SPEAKER Kevin Sweeney - NZ Geospatial Office <i>Growing the Geospatial Industry in New Zealand: Strategies and Realities</i>			
10:00 - 10:30am	KEYNOTE SPEAKER Hon. Gary Nairn - Chairman, VEKTA <i>Establishing Spatial Data Infrastructures as Mainstream Infrastructure</i>			
10:30 - 11:00am	MORNING TEA			
	<b>Emergency Management and Infrastructure</b> Hall B & C (Chair: Nick Weinmann)	<b>Agriculture</b> Rooms 1 & 2 (Chair: James Cameron)	<b>Environmental Management</b> Rooms 10 & 11 (Chair: Daniel Kruiemel)	<b>Extending GIS to Business Intelligence</b> Rooms 3 (Chair: David McDonald)
11:00 - 11:30am	<b>Emergency Information Management - Avoiding Data Catastrophes</b> Nick Hassam - Department of Justice	<b>The use of MODIS imagery for monitoring soil erosion risk in SA agricultural land</b> Dr Ken Clarke - The University of Adelaide	<b>Salinity Monitoring using In-Stream, Close Spaced, Geo-Referenced 3D Salinity Mapping</b> Barry Porter - Department for Water	<b>Business Intelligence and Geographic Analysis: examples from the insurance industry</b> Dr Marcus Brownlow & Jarrad Taylor - Elders Insurance
11:30 - 12:00pm	<b>Adelaide Central Reinforcement (ACR) Program</b> David Floreani & Rachael Potts - Parsons Brinkerhoff	<b>Spatial Information in Precision Agriculture</b> Carl Menges - Apogee Imaging International	<b>Rangeland monitoring using remotely-sensed cross-fence comparisons</b> Adam Kilpatrick - The University of Adelaide	<b>Managing Enterprise Data Assets</b> Nigel Lester - Pitney Bowes Business Insight
12:00 - 12:30pm	<b>Cycle Instead, Journey Planner</b> Craig Walker - Department for Transport Energy & Infrastructure	<b>Can we scale up grain yield estimates at the metre scale to South Australia using remote sensing?</b> Bertram Ostendorf - The University of Adelaide		
12:30 - 1:15pm	LUNCH			

# AFTERNOON

12:30 - 1:15pm	LUNCH			
	<b>Spatial Business</b> Hall B & C (Chair: Penny Baldock)	<b>Community and Planning</b> Rooms 1 & 2 (Chair: Susana Valdivia)	<b>Securing Water Resources</b> Rooms 10 & 11 (Chair: Greg Wilkins)	<b>Surveying</b> Room 3 (Chair: Robin Loechel)
1:15 - 1:45pm	<b>An Insight into the Commercial use of Location Intelligence</b> Morgan Ellingham - Tonkin Consulting	<b>Mapping Population Health Needs for Service Planning</b> Dr John Biggins - SA Health	<b>Re-establishing the 1956 River Murray Flood Level</b> Geoff Sandford - University SA	<b>Audit Surveys- Role of the Surveyors Board</b> Mike Burdett - Surveyors Board
1:45 - 2:15pm	<b>Positioning your Business for Spatial</b> Alexander Gunjko - AREABA	<b>Cardiac ARIA: A Geographic Accessibility Model to Cardiac Services in Australia</b> Dorothy Turner - GISCA	<b>The Use of GIS within Water Allocation Planning</b> Ben Plush - Department for Water	<b>Auditing to Improve Survey Regulatory Compliance</b> Kim Nisbet - Land Service Group
2:15 - 2:45pm	<b>Is GIS Different?</b> David Trengove - ESRI Australia	<b>GIS in Public Housing Management</b> Sandy Kinnear - Housing SA	<b>Application of a DEM to Hydrological Modelling in the South East of South Australia</b> Mary Lewitzka - Department for Water	<b>Networking Australia</b> Francis Sibenaler - SmartNet Australia
2:45 - 3:15	AFTERNOON TEA			
	<b>The Great Debate</b> Hall B & C (Chair: Gary Maguire)	<b>Community &amp; Planning</b> Rooms 1 & 2 (Chair: Dimity Watson)	<b>Environmental Management</b> Rooms 10 & 11 (Chair: Ken Clarke)	<b>Surveying and Measurement</b> Room 3 (Chair: Michael Gear)
3:15 - 3:45pm	<b>Is Spatial Special?</b>	<b>Integrated spatial planning: The 30-Year Plan for Greater Adelaide</b> David Whiterod - Department for Planning & Local Government	<b>Ground cover monitoring for Australia: Ground truthing training in SA</b> Dr Anna Dutkiewicz - Department for Water	<b>The status of the National GNSS Networks and their Impact on National Geodesy</b> Gary Johnston - Geoscience Australia
3:45 - 4:15pm		<b>SA Council Maps – A Collaborative Local Government Website Project</b> John Gosbell - City of Marion	<b>Environmental zonation across the Australian arid region based on long term vegetation dynamics</b> Erika Lawley - University of Adelaide	<b>Visualisation and Analysis of Lidar</b> Gordon Sumerling - ESRI Australia
	Hall B & C (Chair: SIBA Representative)			
4:20 - 4:50pm	Brett Burton - Adelaide Crows GIS in Exercise Sports Science			
4:50 - 5:00pm	CLOSING CEREMONY			
5:00 - 6:00pm	HAPPY HOUR			
7:00 - 11:30pm	SOUTH AUSTRALIA SPATIAL EXCELLENCE AWARDS DINNER			

## KEYNOTE SPEAKERS



### **Gypsy Bhalla**

Incoming President SSSI

Gypsy Bhalla has a degree in Applied Science, majoring in Remote Sensing and GIS, and has worked in the commercial sector in spatial information technology for a number of years focussing on client delivery of imagery and GIS based integrated products. She currently is working within Australian Government, in the Defence Imagery and Geospatial Organisation (DIGO), and has remained within the remote sensing and spatial data areas for over 15 years. Gypsy is completing her MSc in GIS.

Prior to her nomination as president-elect SSSI, Gypsy has been an active member of the ARSPC, SSI, and the SSSI through the ACT Region Committee and the Remote Sensing and Photogrammetry Commission and is working on building and coordinating activities towards the Women's Spatial Network for the ACT Region.



### **Kevin Sweeney**

New Zealand Geospatial Office

Kevin is the Geospatial Custodian, directing the work programme of the New Zealand Geospatial Office within Land Information New Zealand (LINZ). The Geospatial Office is responsible for implementing the New Zealand Geospatial Strategy to facilitate and expand the contribution that spatial information and technologies make to New Zealand's economic growth agenda.

During his seventeen years in the geospatial industry, Kevin has served in both managerial and technical roles throughout the public, private and academic sectors. Prior to immigrating to New Zealand, Kevin worked as a senior consultant and geospatial division manager in the United States. In these roles, he administered staff and operations, managed programmes and projects, and coordinated business development efforts.

He has also worked in government in multiple leadership roles, including as a municipal Director of Technical Services. Kevin has long been an advocate of geospatial education and has led government and academic partnerships to develop tertiary and secondary GIS curricula. Throughout his career, he has delivered geospatial information sessions and presentations for a wide range of audiences.

Kevin holds both a Master of Arts and Bachelor of Science degree in Geography and is certified as a GIS Professional.





## **The Hon. Gary Nairn**

Chairman VEKTA

After a 25 year career as a Surveyor in Australia, the UK and Europe, including 13 years running his own surveying and mapping business, the Hon. Gary Nairn served as the Member for Eden-Monaro in the Australian Parliament from 1996 until 2007.

His Parliamentary career included being the Parliamentary Secretary to the Prime Minister with responsibility for water reform and the Science, Engineering and Technology unit within the Prime Minister and Cabinet, and as Special Minister of State, during which time his responsibilities included e-Government.

He now operates his own consultancy business specialising in business development, spatial information and property matters, and is a member of the SIBA Board of Directors.



## **Brett Burton**

Adelaide Crows, Adelaide Fitness Solutions

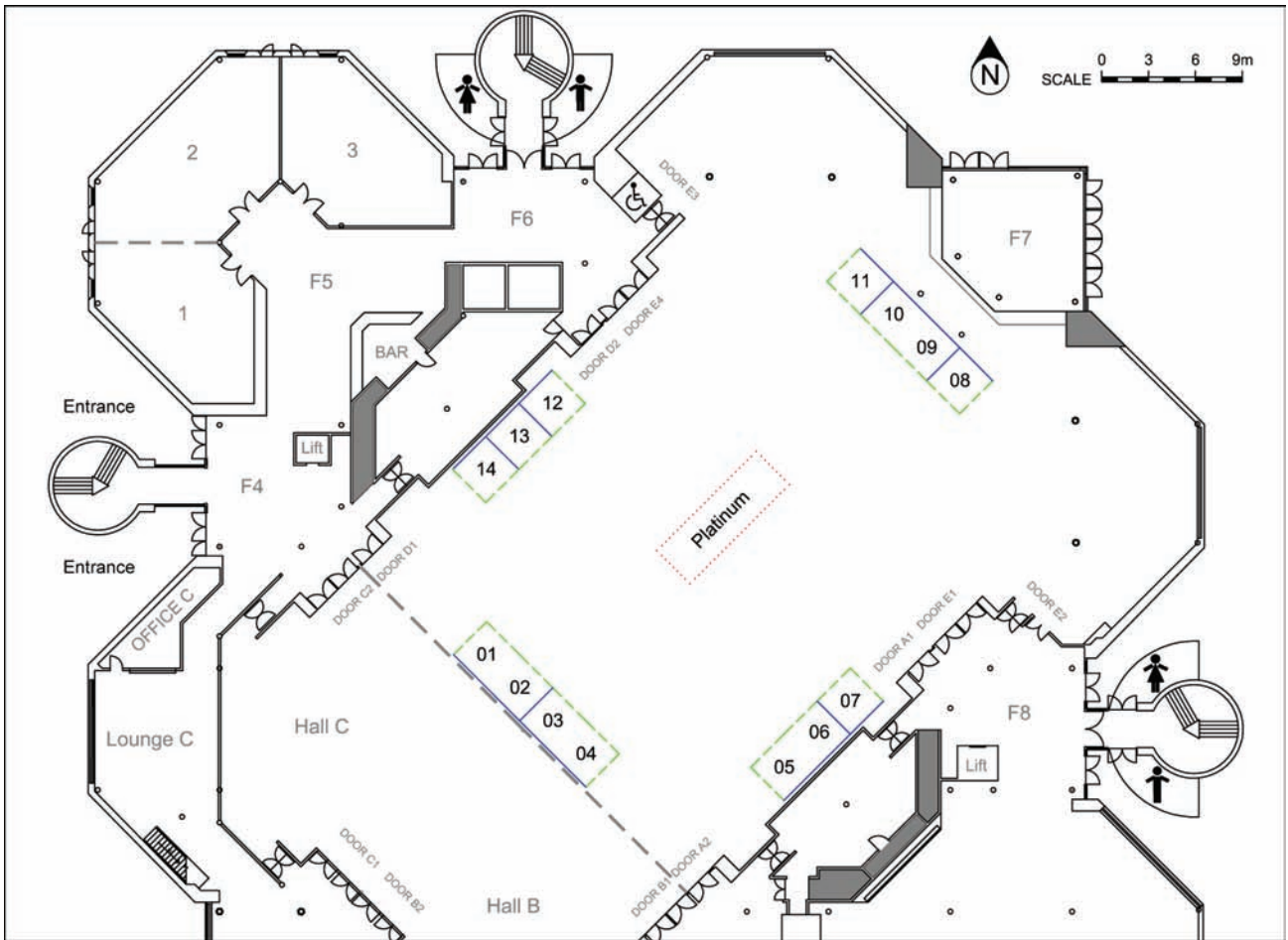
Brett Burton has been a regular fixture on AFL highlight reels since his debut in 1999.

A first round selection at the 1998 National AFL Draft, Burton finished runner up in the AFL Rising Star award in his debut year and stamped himself as a favourite among Crow's fans, who have enjoyed his high leaping marks and accuracy around goals. His career has seen him as the leading goal kicker for the Crows in 2002 and 2008, and awarded the AFL Mark of the Year in 2009.

Brett Burton has a Bachelor of Applied Science (Honours) – Human Movement and is currently developing his business at Adelaide Fitness Solutions where his knowledge of Sports Science is applied to health and fitness solutions.



# Exhibition Hall



## EXHIBITOR'S BOOTH

Aerometrex  
# 11

Apogee Imaging International  
# 3 and 4

Cody Corporation  
# 5 and 6

CR Kennedy  
# 14

ESRI Australia  
Platinum

McMullen Nolan  
# 8

Position Partners  
# 12

SSSI and SIBA  
# 13

Surveying SA  
# 7

Tonkin Consulting  
# 1 and 2

Ultimate Positioning  
# 9 and 10

# General Information

## REGISTRATION INFORMATION

Registration is required on the morning of the day. Upon registration, delegates will be issued with their registration pack including delegate satchel, program handbook and name badge.

Members of Surveying & Spatial Science Institute will be entitled to 6 CPD points for this event. Register your points at <https://members.sssi.org.au>

## DRESS

Conference Sessions: Smart Casual  
SASEA Dinner: Formal or Business

## MOBILE PHONES AND PAGERS

As a courtesy to speakers and other delegates we request that all mobile phones and pagers are switched off before entering sessions.

## NO SMOKING POLICY

ACC has a no smoking policy. Smoking is permitted outside the Centre.

## RECYCLABLE MATERIAL

Please place any unwanted satchel material or rubbish in the appropriate bins located throughout ACC.

## PRIVACY STATEMENT

In registering for this event, relevant details may be incorporated into a delegate list for the benefit of all delegates, sponsors, exhibitors, SSSI and other parties directly related to this Conference.

## PARKING

The Adelaide Convention Centre operates both the Riverbank and North Terrace car parks, which are open 24 hours/day. The car parks are situated under the Convention Centre.

Both car parks are fitted with video surveillance camera systems and security patrols these areas in the afternoon and night.

## PRIZE DRAWS

All prize draws will be conducted during the closing ceremony following the final Plenary Session. Winners will need to be present to accept their prize.

## VENUE

Adelaide Convention Centre  
North Terrace, Adelaide, South Australia  
Telephone: (08) 8212 4099  
Facsimile: (08) 8212 5101  
[www.adelaidecc.com.au](http://www.adelaidecc.com.au)

## SPATIAL INFORMATION DAY 2010 Organising Committee

**Penny Baldock** (Conference Convenor)  
GIS Manager, Dept. for Families & Communities

**Tim Mee**  
Executive Officer, SIBA

**Daniel Kruiemel**  
Licenced Surveyor  
Alexander Symonds

**Gary Maguire**  
Manager BLI, Dept. for Families & Communities  
Director SSSI and SSSI SA Chair

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## WEBSITE

[www.spatialinformationday.org.au](http://www.spatialinformationday.org.au)



# ABSTRACTS

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## Emergency Information Management - *Avoiding Data Catastrophes*

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**Session:** Emergency Information  
Management & Infrastructure

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**Presenter:** Nicholas Hassam

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**Time:** 11:00am

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**Room:** Hall B & C

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### Introduction

As evidenced by the 2009 Victorian bushfires, the need for information before, during and following catastrophic events is critical. The Public Safety Communications Unit; a part of the South Australian Department of Justice, has developed a comprehensive spatial information system to manage emergency data for the state. The collation, management and dissemination of disparate spatial data have provided multiple challenges which will be discussed during this presentation.

### Project Objectives

The primary objective of the Public Safety Communications' spatial information system is twofold;

- To collect, maintain and provide spatial data required for the effective operation of the South Australian Computer-Aided Dispatch (SACAD) system
- To provide a platform for the development and dissemination of spatial data and services, in the context of the state's emergency information

### Methodology

Emergency information has its own intrinsic peculiarities and spans the full spectrum of geographic repositories. The information required extends beyond the frequently-used business rules of much of the base-data, and the reliance upon high availability and quality cannot be understated. As such, substantial extract, transform, load (ETL) and quality assurance (QA) procedures are required, utilising third-party middleware and integrated applications to ensure timely, accurate and fit-for-purpose data enters the emergency information system from a wide variety of disparate sources.

The approach to managing emergency data has at its heart an enterprise geographic

information system that addresses the fundamental goals of the project. Surrounding this infrastructure are resources and processes that enable the flow of data from source to sea.

### Results

Following years of discussion and collaboration with external data custodians and the development of robust data cleansing and manipulation processes, a consistent data feed from origin to emergency information system has been developed. The resulting GIS provides a robust, cutting-edge hardware and software environment, combining high-end computing power with server-based enterprise GI software. This is distributed either as open form data, web applications, or web services.

### Conclusions

When collating information from multiple disparate sources, the importance of data "broking" cannot be understated. Further consolidation of the state's spatial information will make the process of sourcing and collecting data a more simplified process. Robust solutions for emergency information management are essential for the timely supply of data for emergency service call receipt and dispatch, and to aid in catastrophic event management and prevention. All this is done in the hope of avoiding data catastrophes.

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## Adelaide Central Reinforcement (ACR) Program

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**Session:** Emergency Information  
Management & Infrastructure

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**Presenter:** David Floreani

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**Time:** 11:30am

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**Room:** Hall B & C

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### Introduction

Adelaide Central Reinforcement (ACR) program is one of South Australia's largest and most significant infrastructure projects at a total estimated cost of \$250m. The program is a response to the Electricity Transmission Code's requirement for a back-up power supply to the Adelaide CBD. As the owner and manager of SA's electrical transmission

systems, ElectraNet engaged professional services company Parsons Brinckerhoff (PB) to assist in the site selection of a new substation on the CBD's fringe and route selection of a high voltage cable from the new substation to one of four major existing substations across metropolitan Adelaide. Throughout the process of high level route selection, detailed route design, planning and environmental approvals, community consultation, procurement and construction management, GIS has been used by the project team as an integral decision support, data management and data visualisation tool.

### Methodology

Initially spatial analysis methods were applied to assess and determine the most feasible route corridor from the CBD to one of four major substations across metropolitan Adelaide. This involved performing proximity analysis to "sensitive receptors" such as schools, health centres, heritage sites, reserves. Once the preferred corridor was selected, GIS assisted in the detailed route design by locating and displaying under and above ground services, such as electrical and data cables, gas pipelines, water pipes and telecommunications infrastructure. To aid collaboration and assist in the procurement process for the subsequent construction phase, an innovative GIS mapping product was developed for supply to prospective tenderers containing the project's spatial and non-spatial data. This allowed tenderers to make more informed costing decisions, which ultimately will assist the project budget. The use of this product is ongoing and is being further developed to aid the construction management phase.

### Results

The delivery of the project not only achieved the objectives set by ElectraNet but also emphasised the value and importance of GIS in a project of this nature. Using GIS helped identify a new sub-station at Keswick Terminal as well as the design of a route alignment for a high voltage underground cable from the new substation to the Torrens Island Power Station.

### Conclusion

The ACR program is an excellent example of how GIS can be used from inception to delivery on a large infrastructure project. It has also shown how Geospatial tools can be used to contribute to a collaborative data

sharing environment between client, consultant and contractor. Ultimately and most importantly, GIS helped ElectraNet achieve their outcome more efficiently and accurately than would have otherwise been possible using traditional methods.

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### Cycle Instead, Journey Planner

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**Session:** Emergency Information Management & Infrastructure

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**Presenter:** Craig Walker & David Trengove

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**Time:** 12:00pm

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**Room:** Hall B & C

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Cycle Instead is an initiative encouraging South Australians to give cycling a go. DTEI has made significant investment in public education and bike infrastructure to make cycling more appealing as a safe and enjoyable mode of transport. The Bike Journey Planner provides cyclists with the ability to determine their journey using different criteria such as quickest or easiest path in real time. This planner is based on ESRI's ArcGIS platform integrated with Google Maps API in an engagement with ESRI Australia. This joint presentation details the business drivers and the technology solution; more importantly includes a live demonstration.

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### The use of MODIS Imagery for Monitoring Soil Erosion Risk in SA Agricultural Land

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**Session:** Agriculture

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**Presenter:** Ken Clarke

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**Time:** 11:00am

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**Room:** 1 & 2

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We report progress on a collaborative research program that is developing procedures for use of MODIS imagery for monitoring soil erosion risk across the cropping agricultural lands in South Australia. The image-based monitoring aims to enhance the current field-based assessment of land condition conducted by government agencies, and provide objective and comprehensive reporting for State erosion protection targets.

The initial stage of the project involved a comparison of Moderate Resolution Imaging Spectrometer (MODIS) image indices for understanding seasonal dynamics of soil exposure. Empirical relationships were



established to test sources of error inherent in the image indices.

Preliminary research in phase two of the project involves analysis of time-series MODIS BRDF imagery using relative spectral mixture analysis (RSMA) recently developed by the University of California. The technique is designed to be especially useful in regions with significant cover of non-photosynthetic vegetation, arid regions and regions with seasonal snowfall.

The paper introduces the first use of RSMA technique in Australia and presents preliminary findings on applying the technique to BRDF product in cropping districts of South Australia.

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### Spatial Information in Precision Agriculture

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**Session: Agriculture**

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**Presenter: Carl Menges, Fabrice Marre, John Douglas, Leighton Wilksch**

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**Time: 11:30am**

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**Room: 1 & 2**

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Apogee Imaging International has developed a web based 3D visualisation and analysis service for the delivery of decision level information from spatial data acquired by satellites and aerial platforms. Landmark has formed a strategic alliance with Apogee to utilise this capability under the name of FARMIMAGE® for the integration of historical and current imagery, capturing extensive detail about plant growth patterns within paddocks. The identification of prevailing growth conditions provides the means to maximise the benefit of nutrition application in precision agriculture services and increases profitability of farming practices nationally.

The efficiency of farming can now be increased by unlocking the information available from space and aerial observations. Apogee achieved this breakthrough by applying our expertise in remote sensing and software development, and drawing on the latest and best technology basis available. In FARMIMAGE®, 20 years of spatial information are now accessible for most farming properties to enable them to gauge the performance of the land over time and make improved decisions for the current season. The information provides clues on yield limiting factors and can greatly increase the output to

input ratio when combined with other available information and the understanding of the Agronomist.

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### Can we Scale Up Grain Yield Estimates at the Meter Scale to South Australia Using Remote Sensing?

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**Session: Agriculture**

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**Presenter: Bertram Ostendorf, Greg Lyle and Kelly Arbon**

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**Time: 12:00pm**

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**Room: 1 & 2**

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Climate change may severely impact the grain growing areas of Australia in several ways. Yield may change due to a different biophysical regime but external drivers such as a price paid for carbon may influence the future adoption of alternative land uses. To make these decisions, growers will need robust data to compare the financial prospects of current and potential farming activities.

Land holders are increasingly using precision agriculture information as they appreciate the merits of high resolution data for on farm decisions but adoption of precision agriculture has been limited. The value of precision agriculture information increases substantially with the length of the time period for which information is available. The spatial resolution of LANDSAT imagery is comparable to that of yield maps and because of the inherent relationship between NDVI, green biomass and yield it should be theoretically possible to increase access to yield maps within farms and regions using remote sensing.

In this research we test the generality of yield prediction from satellite imagery. We use 640 paddocks across South Australia to calibrate NDVI-Yield relationships. We evaluate the prediction models using district level PIRSA yield statistics. We test under which conditions an extrapolation of the models in time and/or space is possible without increasing the error.

The results show that broad scale yield pattern are predictable from a small spatial sample of high resolution yield data. The models successfully capture the variability of the regional yield potential with a model efficiency (Nash Sutcliffe) of up to 0.65 even when extrapolating in time.

The analysis provides evidence that it is possible to scale up from fine-scale yield mapping to the entire SA cropping region

and that the relationships hold between years. NDVI pattern from LANDSAT imagery can be used to generate high resolution yield maps at a large regional extent with models derived from precision yield mapping.

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### Salinity Monitoring using In-Stream, Close Spaced, Geo-Referenced 3D Salinity Mapping

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**Session:** Environmental Management

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**Presenter:** Barry Porter

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**Time:** 11:00am

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**Room:** 10 & 11

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Historically the River Murray in South Australia has carried large tonnages of dissolved salts (>1000 tonnes/day), sourced both from upstream of SA and from accessions within the state. This tonnage of salt converted to EC, at times exceeds World Health Organisation guidelines for potable water of 800 EC, and also exceeds desirable irrigation water EC for crop health.

In SA, continuous monitoring of in-stream EC has expanded to over 50 monitoring sites in 2010. Generally, these continuous EC logging stations are spaced between 20 and 30 river kilometres apart and usually at the start and end of river reaches of interest. These reaches include proposed and existing Salt Interception Schemes, areas of natural and irrigation induced salinity accessions, and reaches where defining salt loads is an important river management tool.

As well as continuous long-term monitoring, South Australia conducts Run of River salinity surveys which produce a kilometre-by-kilometre "snapshot" of salinity accessions along the length of the river. These surveys take place whenever suitable river flow conditions occur, generally on an annual basis.

Both techniques produce generalised reach-based salt loads to a km scale, however, the necessity for high location accuracy salinity mapping has been apparent for some time.

In-Stream, Close Spaced Geo-Referenced 3D Salinity Mapping is the most recent development in salinity monitoring in South Australia. Details of the equipment, data collection and processing techniques used to provide a 3D view of salinity accessions with salinity gradient mapping of accessions and mixing zones are presented. Multiple examples

examples of salinity accession mapping and the influence of this data collection technique on Salt Interception Scheme design are also presented.

The data processing steps are presented, including converting the original Excel data into a point shapefile, the generation of a new digital elevation model (DEM) data incorporating the water body bottom elevation of the point shapefile and the conversion of 2D to 3D point shapefile.

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### Rangeland Monitoring Using Remotely-sensed Cross-fence Comparisons

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**Session:** Environmental Management

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**Presenter:** Adam Kilpatrick

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**Time:** 12:00pm

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**Room:** 10 & 11

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#### Introduction

Rangelands are extensive, often remote regions of our planet, and difficult to monitor using field methods alone; consequently remote sensing is often suggested as a means of monitoring rangeland production and degradation. However, it can be difficult to decipher degradation and the effects of rangeland management from the wealth of information present in remotely sensed imagery, against a background of natural landscape and climate variation. Paired sampling designs involving cross-fence comparisons allow control of natural independent variables, and have been used widely in ecological and rangeland studies. We present an innovative methodology for controlling the background environmental variation present in rangeland systems, allowing the use of remotely sensed imagery to rank paddocks against each other based on cross-fence comparisons.

#### Methods

Remotely-sensed vegetation cover is used as a surrogate for land condition. The image-derived cover data is sampled in pairs at regular intervals, either side of paddock (field) fencelines. The ratio of condition for two adjacent paddocks can thus be determined using the mean cross-fence ratio ( $r_{pi}$ ). The relative score for each paddock can then be determined as the mean of all its neighbours' values, multiplied by their cross-fence ratios:

$$v_p = \frac{1}{m_p} \sum_{i=1}^t r_{pi} v_i$$

Where  $v_p$  = value of a paddock,  $m_p$  = number of neighbouring paddocks,  $r_{pi}$  = mean cross-fence ratio,  $v_i$  = value of all other paddocks in system,  $t$  = total number of paddocks in the system. The set of simultaneous linear equations subsequently developed, one for each paddock, is solved to provide a relative value to be used as a rank for each paddock in the system.

We have conducted trials of this method using small and large scale model paddock arrangements and simulated cover rasters. We also tested it in an arid rangeland and mining area of South Australia using Landsat TM imagery, comprising of 20,392km<sup>2</sup>, 12 properties, and 121 fenced paddocks.

### Results and Discussion

Theoretical modelling shows that the fundamental premise of the methodology holds, and points to some of the potential improvements needed, such as accounting for the effects of distance to water (grazing gradients). Application in the test region produced a ranking of paddocks consistent with local expert assessments of condition, in the absence of any suitable comprehensive field monitoring data. This method is restricted to developed rangeland areas where grazing is conducted in discrete management units divided by fences. It controls for independent environmental variables without the need to quantify them. Our ongoing development of the methodology will include weighting factors to account for the effects of grazing gradients on vegetation cover at the fenceline sample points, thus accounting for variations in condition throughout the paddock. Application of this approach to different epochs of satellite imagery will allow temporal monitoring of relative rangeland condition over broad areas.



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## Business Intelligence and Geographic Analysis: examples from the insurance industry

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**Session:** Extending GIS to Business Intelligence

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**Presenter:** Dr Marcus Brownlow and Jarrad Taylor

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**Time:** 11:00am

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**Room:** 3

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Business intelligence (BI) is often used as a synonym for business reporting, where various KPIs are quantified on a periodic basis and their magnitude compared with prior periods or wishful forecasts. It can be backward-looking. Real value from BI comes when intelligent analysis and interpretation of data can positively influence a commercial bottom line by reducing cost or increasing revenue. This paper presents a real world example of how operational business data and systems, when combined with knowledge of geographic location, can provide powerful insight into risk exposure and cost in the insurance industry, and therefore the broader economy.

Geographical location is a principal determinant of exposure to catastrophic loss from bushfire, earthquake or tropical cyclone, and less severe losses from other weather events. The insurance industry generally, and the reinsurance industry more specifically, regularly analyses geographic risk profiles to more accurately manage financial risk and underwriting profitability. The paper provides examples of geographic visualisation of recent cyclone events and visits the perennial challenges of data quality, geocoding and geographic visualisation. Furthermore, it emphasises how GIS techniques can be employed without the use of dedicated GIS software.

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## Managing Enterprise Data Assets.

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**Session:** Extending GIS to Business Intelligence

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**Presenter:** Nigel Lester

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**Time:** 11:30am

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**Room:** 3

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Learn about the organisational imperatives, challenges and opportunities facing

organisations when trying to manage enterprise data and how organisations are incorporating location data information into their business processes.

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## An Insight into the Commercial Use of Location Intelligence

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**Session:** Spatial Business

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**Presenter:** Morgan Ellingham

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**Time:** 1:15pm

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**Room:** Hall B & C

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### Location Intelligence – what is it?

The ability to link customer and operational data with locations is the first step to making critical business decisions. Once that first step has been taken knowing where key business drivers are located can open up a world of opportunity to visualise patterns and trends to grow a business or franchise. Analysing and making sense out of the patterns and information can then, in turn, drive quality decision making. Finally, the ability to make the right decisions enables organisations to have confidence in their business process and planning for the future can more done with a greater efficiency.

### Knowing, not guessing

Knowing, not guessing or going by gut feel could be the difference between a successful marketing campaign and one that fails. Local Intelligence has become a driving force to help companies accurately determine how they spend their marketing dollar. Maximising the marketing budget is all about selling to the right people, more often.

- Where is your target audience located?
- Where are they willing to travel to?
- What services are they are willing to travel for?
- How does your market compare to other regions?
- Where are the profitable markets located?
- Where should assets be placed to improve service delivery and efficiency?
- What if a competitor builds a store in a certain location?
- What if demographics in a key market change?

Gaining an intelligent answer to these questions translates directly to optimising business and marketing resources.

### Real Business Questions

This presentation provides an overview of Tonkin Consulting's experience experience in

unlocking the power of LI within the commercial sector. We will be demonstrating real life examples of how Tonkin Consulting has helped SA businesses become spatially intelligent. Some examples are included:

- A lawn mowing franchise has undertaken a customer survey and found that the majority of their customers are single men with a high disposable income but who are time poor due to their choice of occupation. Using Location Intelligence enables the organisation to find all the addresses of the single men, with an income of greater than 70K that are in a managerial position.
- A large lending institution needs to build a new branch to improve service delivery. They have a customer database with all their addresses. Using LI enables the business to build a new branch and ensure 2,000 customers are within 10 minutes travel time.
- A start-up specialist furniture store has noticed a lot of business is coming from a particular sales territory, seemingly without explanation. Using LI the store can determine the demographic and consumer profiles of the area and find where similar regions are located.

In closing, Location Intelligence is gaining traction within the Commercial sector. Our presentation will provide a valuable insight into how Commercial organisations are leveraging Location Intelligence to enhance their business decision making process.

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## Positioning your Business for Spatial

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**Session: Spatial Business**

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**Presenter: Alexander Gunjko**

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**Time: 1:45pm**

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**Room: Hall B & C**

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### Introduction

Many organisations structure their GIS as a business function, with spatial expertise located within a discrete business unit or group. Whilst this takes advantage of efficiencies in co-locating expertise, it can also have the unintended effect of creating a "spatial silo".

An oft-quoted biological insight is that "specialisation" is the last stage before extinction". With any change in the business, specialist groups are often targeted early for "right-sizing", as it is assumed that the rest of the business can absorb their expertise.

This paper argues that rather than accepting an inevitable dilution of spatial expertise into the business, the spatial team can strengthen its position within the business by addressing this need early and head-on.

An example is used to illustrate the stated technique.

### Objective

In order for spatial information to generate more value to the business, its relevance to normal business processes needs to be articulated in a systematic, highly visible way. This talk presents a formal technique to achieve just this type of communication.

### Methodology

The difference between business function and business process is defined. This leads to the description of a standard (although still not fully appreciated) business process mapping technique, enhanced to explicitly take into account spatial concepts.

### Results

The end result is the identification and detailed specification of business processes for which spatial information provides significant value.

### Conclusion

This talk shows that normal business process modelling of workflow can help identify where spatial information generates business value in actual practice. It therefore provides a means whereby the spatial team can break beyond its functional boundaries, and provide critical service for end-to-end business processes. This can significantly improve the positioning of spatial services within the business.

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## Is GIS Different?

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**Session: Spatial Business**

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**Presenter: David Trengove**

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**Time: 2:15pm**

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**Room: Hall B & C**

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As an industry, we are often faced with the question "is spatial special?" The growth of the location intelligence highlights the power and depth with which our industry is able to contribute across a broad range of commercial businesses, governments and not-for-profit organisations. Then there is the growth offered by Web 2.0, Cloud Computing, Project Delivery Methodologies, IT Convergence and the prolific acceleration of technologies enabling organisations to

achieve true location intelligence capability. This presentation will highlight some of the challenges and opportunities in our industry, and will look at how GIS technology is leveraging the latest IT developments to ensure location intelligence is seen as not just the same, but different – and for good reason

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## Mapping Population Health Needs for Service Planning

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**Session:** Community and Planning

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**Presenter:** Dr. John Biggins

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**Time:** 1:15pm

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**Room:** 1 & 2

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### Introduction

SA Health Strategic Plan identified key strategic objectives for reform of the health system, which included “implementing a population health approach to health service planning, funding and delivery ... that takes into account the broader determinants of health and well-being”. In order to achieve these objectives, service planners require ready access to data that is relevant, of known quality and in a format that is fit-for-purpose.

### Objectives

Spatial Information Portal (SIP) was developed as a single entry point for providing enterprise-wide access to data to support the development of service plans designed to address priority health needs within their local communities. This involves being able to assess population health status since it is one of the key drivers of service demand, as well as describing the current provision of services and evaluating the extent to which it meets current levels of demand.

Service planners also need information regarding patterns of service utilisation, such as the nature and extent to which residents within a region are utilising health care services available from local providers as opposed to accessing these same services from providers outside of the local area. The key objectives for SIP were to provide users across the enterprise with access to:

- Consistent data as a common evidence based for service planning decisions.
- Common models and business rules for analysing data.
- Range of user interfaces customised to meet the specific data requirements

and levels of technical expertise of different types of users.

### Methodology

Measures for assessing population health status included estimated prevalence rates for risk factors, diagnosed and undiagnosed conditions for a range of chronic diseases based upon data from population survey and hospital service activity. Prevalence rates were calculated for different population types to identify those at most risk (based upon high prevalence rates) as well as map their distribution.

Analysis of the patterns of service utilisation involved:

- Determining the origins (SLA) of patients accessing inpatient services from hospitals; and/or
- Determining the destinations (hospitals) where patients go to access services.

Users are able to apply “filters” to create different views of the data by selecting different hospitals, SLAs, services, age, gender and time periods.

### Results

SIP provides access to key corporate data to assist service planning. Different interfaces are available that meet the needs of different types of users and their preferences for how to analyse and display data. This is achieved through the integration of different technologies including GIS (provided by ArcGIS Server from ESRI) and business intelligence (provided by Business Objects from SAP Australia). This provides SIP users with access to the powerful data query and reporting capabilities available within the BO suite of products, with the option of publishing this data using ArcGIS Server map services.

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## Cardiac ARIA: A Geographic Accessibility Model to Cardiac Services in Australia

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**Session:** Community and Planning

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**Presenter:** Dorothy Turner

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**Time:** 1:45pm

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**Room:** 1 & 2

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### Background / Aims

In a cardiac emergency every minute counts. Access to appropriate care immediately following an acute cardiac event is critical for positive outcomes. Current evidence shows that most lives are saved by treatment within

the first hour. In 2006 cardiovascular disease claimed the lives of almost 46,000 Australians (34% of all deaths). The aim of the Cardiac ARIA index was to derive an objective, comparable, geographic measure reflecting access to cardiac services across Australia.

### Methods

The index was modelled in two key stages. First an expert panel of cardiologists developed a single patient care pathway for major cardiac events, from which a master list of healthcare resources and services was derived. From this list, 9 national datasets were acquired to model geographic accessibility, using cost path analysis to measure time and distance to cardiac facilities. Two phases were measured; acute care and aftercare.

The acute phase of the index measured the time taken, from dialling 000, to reach the most appropriate medical facility (using 5 classes of hospital/remote clinic) via the road network by ambulance. Time frames were calculated to include dispatch time, travel to the scene, time to assess and load the patient, and travel to the medical facility. The aftercare phase measured time to 4 service categories (medical centre/doctor, retail pharmacy, cardiac rehabilitation program, and pathology) for follow-up care upon returning home. The analysis was applied to over 20,000 localities, which were then linked to census population data.

### Results

The acute phase of the index ranges from 1 (access to a tertiary hospital with a cardiac catheter laboratory  $\leq$  1 hour) to 8 (no road ambulance service,  $>$  3 hours to any medical facility and air transport required). The aftercare phase was modelled into 5 alphabetic categories, A (all 4 services  $\leq$  1 hour) to E (no services available within 1 hour).

Approximately 13 million (66%) Australians live within Cardiac ARIA Category 1A locations (i.e. a hospital with ICU/CCU and cardiac catheter laboratory and all aftercare  $\leq$  1 hour), however 6.7 million (34%) live outside of this range.

### Conclusion

These data indicate that "geographically" the majority of Australian's are located in communities that have timely access for survival. At a strategic level, the index will provide a valuable tool for researchers to inform development of policy for systems of care. The methodology could be used for other diseases, such as stroke, where time to services is also important.

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## GIS in Public Housing Management

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**Session:** Community and Planning

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**Presenter:** Sandy Kinnear and Reaksmeiy Sim

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**Time:** 2:15pm

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**Room:** 1 & 2

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Housing SA manages around 45,000 dwellings across the State. Metropolitan Adelaide has around 75% of these and around 12,000 of those dwellings are found within transport corridors defined in the recently released 30 Year Planning Vision for Greater Adelaide.

Utilising this public housing in urban renewal projects has potential to help achieve the urban planning targets for increased urban infill at higher housing densities. In addition the new social housing constructed in these sites helps improve the overall average age, condition and suitability of social housing.

This paper presents the results of spatial and other analysis used define these locations and prioritise urban renewal.

The recent commenced Woodville West Urban renewal program is used to illustrate the kind of housing and place-making outcomes that result.

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## Re-establishing the 1956 River Murray Flood Level

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**Session:** Securing Water Resources

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**Presenter:** Geoff Sandford and Martin Edwards

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**Time:** 1:15pm

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**Room:** 10 & 11

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In 1956 the flood of the River Murray was the largest known since white settlement. The actual height of the flood level in Riverland regions has been recorded in various files and "water marks" have been located in many places.

The authors were asked to verify the validity of a digital definition of the flood level in the Lower Lakes area of the Murray. Finding a traceability chain to verify this data proved to be almost impossible. It was a classic "cold", (and wet), case.

Most of the bench marks used by the Engineering & Water Supply in the flood era were gone and their value on AHD, (Australian Height Datum 1971), could not be verified. Therefore published lists of flood levels at various locations could also not be verified.

Going back to first principles was the only answer. The method used by the authors involved re-establishing AHD levels, (E.L.s), for the flood from observations of two attributes:

1. E.L.s on existing monuments depicting flood levels
2. E.L.s on the natural surface where the flood level can be clearly identified from flood level peak photography

Three data sets were used to assist in locating "natural surface" flood level points.

1. The 1956 flood level shown on the 1:10,000 scale orthophoto maps produce by the Lands Department in the 1970's.
2. The cadastral (boundary) framework shown on orthophoto maps
3. The 1956 flood level peak aerial photography

The event had a profound effect on many aspects of "river life". One author was involved through the classification of shack sites and, later, the freeholding of land. The re-establishment of the flood level was vital to both projects since certain approvals could not be given below the 1956 flood line. Until completion of this project it was not known how accurately the "flood line" could be re-defined, forty-four years later.

The livelihood of many people and businesses have been affected by the positioning of the flood line. This paper presents a method of defining the position of the 1956 Murray River flood line both from aerial photography and recovered together with statistics.

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## The Use of GIS within Water Allocation Planning

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**Session: Securing Water Resources**

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**Presenter: Ben Plush**

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**Time: 1:45pm**

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**Room: 10 & 11**

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The rapid development of farm dams in many regions of South Australia over the past two decades has raised concerns regarding the sustainability of water resources and impacts to local ecosystems. In some areas, these concerns were sufficient to require the implementation of formal management controls, which are administered through a Water Allocation Plan (WAP). In recent experiences, GIS has proven to be an integral tool in the WAP development process. Baseline spatial data collected to support WAP development has included farm dams,

reach types, swamps and wetlands, as well as the creation of WAP specific data such as Surfacewater Management Zones and Groundwater Management Areas. This data has then been used in a variety of projects of varying complexity, including:

- Developing an ArcHydro model based on a 10m pixel resolution DEM for two of the Prescribed Water Resource Areas. This model has been used to develop a tool which can help assess licensed dams individually, enabling the identification of surface water areas that have been over allocated, relative to available runoff and ecosystem requirements.
- Determining the location of on-stream farm dams with potentially large storage and large contributing catchments. There is a higher probability that these dams are taking more than the landholder is licensed to capture.
- Locating high intensity groundwater extraction zones using a square kilometre grid over specified Groundwater Management Areas. The total extraction for each cell was then compared to a sustainable extraction limit for each area. This gives an indication of where the ground water resources are under stress.

GIS projects completed as part of the WAP development process can provide a better understanding of where water resources are being over utilised. The spatial component of the projects is critical, with many business decisions relying on the accuracy and currency of the data. As a result, it is anticipated that there will be an increasingly important role for GIS and spatial data in the WAP development and review process.

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## Application of a Digital Elevation Model to Hydrological Modelling in the South East of South Australia

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**Session: Securing Water Resources**

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**Presenter: Mary Lewitzka**

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**Time: 2:15pm**

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**Room: 10 & 11**

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The south east of SA is an area of low topography covering approximately 28 000 km<sup>2</sup>. Drainage is ill defined, natural drainage has consisted of a small number of cross-border streams draining from Victoria in to extensive wetland systems draining slowly towards the Coorong in the north west of

the region.

Natural drainage has been extensively modified since settlement by the construction of a network of drains to remove water from the landscape and make the drained land productive for agriculture. With increasing awareness of the importance and value of wetland systems comes the need to actively manage them.

As part of a NWI-funded project to develop a surface water management strategy for the SE region a digital elevation model (DEM) was developed, jointly funded by the National Water Commission; the DWLBC; DEH; and ForestrySA at a total cost of \$1.5 million. The project was managed by the South East Resource Information Centre (SERIC) in Mount Gambier.

The elevation data was collected by AAM Hatch Pty Ltd between July 2007 and December 2008 using airborne laser scanning (LiDAR) and involved the collection and processing of in excess of 10 billion laser returns. DEM data was supplied in 11 separate instalments with subsequent validation undertaken by DEH before raster DEM data was supplied to DWLBC via SERIC.

The gridded DEM data was supplied as 8000 or so 2km x 2km data tiles, with each tile having DEM data at both 10m and 2m horizontal resolutions. Target vertical accuracy was +/- 0.15m across the project area. With the addition of similar data supplied by the Wimmera Catchment Management Authority (VIC), DWLBC created a single regional 10m DEM (ESRI file geodatabase).

DWLBC have used the DEM to define the stream network from the modelled topography using the ArcHydro suite of tools. Extensive pre-processing was required in the form of "stream burning" and "wall building" to ensure that ArcHydro accurately modelled known drainage patterns (eg. drains). Constructed features such as drain crossovers presented particular challenges. The use of ArcHydro enabled catchments and watersheds to be defined accurately and consistently.

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## Audit Surveys - Role of the Surveyors Board

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**Session:** Surveying

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**Presenter:** Mike Burdett

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**Time:** 1:15pm

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**Room:** 3

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The Survey Act places an obligation on the Surveyor's Board of South Australia to exercise a general oversight over the professional practice of surveyors. The audit process is used as one of the mechanisms for undertaking this function. Following a review of the Audit process and assessment itself it seems timely for the Board to review its role following audits. This presentation aims to set out for the profession the Board's procedures and expectations that result from the audit process.

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## Auditing to Improve Survey Regulatory Compliance

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**Session:** Surveying

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**Presenter:** Kim Nisbet

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**Time:** 1:45pm

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**Room:** 3

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Regulatory compliance is most effective if there is synergy between persuasion and punishment. Treating regulatees with a client focus constitutes a 'gift' in social exchange that is more likely to be reciprocated in the form of compliant behaviour. Assessment of survey errors detected by audit has been revised to provide a better indication of a surveyor's rating. It is proposed surveyors be rated at one of five levels between very low and very high risk based on their audit compliance. Audit assessment will focus on redefinition and errors not detectable by survey examination. Redefinition compliance will be assessed on degree of certainty, impact on the cadastre, and mitigation (such as error in previous redefinition), rather than whether non-compliance is indisputable.

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## Networking Australia

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**Session:** Surveying

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**Presenter:** Francis Sibenaler

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**Time:** 2:15pm

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**Room:** 3

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Modern day satellite positioning systems are

revolutionizing the way many industries undertake their operations. The past decade in Australia has seen the development and installation of CORS (Continuously Operating Reference Station) Networks in the various states and territories. So far, the Victorian Government has set the standard with the establishment of GPSNet, consisting of over 70 permanent stations throughout the state of Victoria.

In areas where this service has not been provided by a governmental body, it is left up to the commercial sector to step in and provide. SmartNet Aus is a joint venture between Leica Geosystems and C.R. Kennedy, and is a commercial based RTK Network Solution. The aim of SmartNet Aus is to provide an Australian Nationwide GNSS Data service for use in any applications requiring positions, through either transmission of Real Time Corrections, or through Post-Processing solutions.

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### Is Spatial Special ?

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**Session: The Great Debate**

**Presenter: SSSI Young Professionals**

**Time: 3:15pm**

**Room: Hall B & C**

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This session will examine the question - Is Spatial Special?

Is spatial information special or do some GIS professionals believe it is because they are passionate about what they do? Is spatial data no different to financial data or digital spreadsheets?

The Young Professionals of South Australia are challenging the "Baby Boomers"

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### Integrated Spatial Planning: The 30-Year Plan for Greater Adelaide

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**Session: Community and Planning**

**Presenter: David Whiterod**

**Time: 3:15pm**

**Room: 1 & 2**

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The 30-Year Plan for Greater Adelaide (the Plan) has been prepared by the South Australian Government to guide the community, local government, business and industry. Together, the Plan and the planning strategies for country South Australia form the South Australian Planning Strategy

(2007). As such, a great deal of spatial information and analysis be used in the formulation of the plan.

The main points of difference between the Plan and previous planning strategies has been

- A much stronger spatial emphasis
- Strategic rather than regulatory emphasis
- Integrated spatial planning incorporating whole-of-government priorities.

Spatial analysis guided the development of the plan and will continue to allow the spatial expression of planning policy into the future.

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### SA Council Maps – A Collaborative Local Government Website Project

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**Session: Community and Planning**

**Presenter: John Gosbell, Dimity Watson and Georgina Cassar**

**Time: 3:45pm**

**Room: 1 & 2**

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SA Council Maps is a web site that provides the community with access to South Australian Local Government related spatial information obtained from local and state government.

Initial discussions regarding the feasibility of implementing a spatial website portal for South Australian Councils commenced in early 2007. At Spatial Information Day 2008, a proof of concept website was demonstrated containing data from 7 South Australian Councils that had formed a working party. Since then the project has continued to gather momentum with 38 South Australian Councils participating in a website trial that commenced in November 2009. In May 2010, the SA Council Maps website project was awarded overall winner of the 2010 Australian Government 'Excellence in eGovernment' Award.

Objectives and benefits for Councils:

- Resource sharing of skills, funding, licensing and infrastructure;
- A low cost public solution for Councils that have limited resources;
- Provide the community with an increased level of customer service;
- Fosters working relationships between State and Local Governments;
- Streamlines data acquisition from State Government agencies; and
- Reduction of carbon footprint through sharing resources and hardware.

Benefits for the public:

- 24/7 access to information on Council services and planning regulations in their local area;
- Enables the community to find answers to such questions as:
  - When is my waste collected?
  - Where is my Council and how do I contact them?
  - Where are the nearest libraries, schools, parks and playgrounds?
  - What is my Council Ward and who are the Elected Members?
  - What is my Council Ward and who are the Elected Members?
  - How do I get to my desired destination by public transport?
  - What properties are for sale in the area?
- Access map data seamlessly across many Council areas from a single application offering a consistent usability experience;
- Launch into other web mapping applications (e.g. Google Maps & DTEI's Property Assist) from one portal .

This presentation will demonstrate the web site and will provide an overview of the challenges, lessons and future directions of this collaborative project.

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## Ground Cover Monitoring for Australia: Groundtruthing Training in SA

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**Session: Environmental Management**

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**Presenter: Dr Anna Dutkiewicz**

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**Time: 3:15pm**

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**Room: 10 & 11**

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### Introduction

The National Groundcover Project led by The Department of Agriculture, Fisheries and Forestry (DAFF) aims to deliver a national approach for monitoring ground cover that will inform landscape condition (soil exposure and pasture/crop condition). Ground cover is being monitored across Australia using high temporal resolution broadscale remote sensing imagery (Moderate Resolution Imaging Spectrometer imagery or MODIS).

The South Australian Department of Water Land and Biodiversity Conservation has been as strong supporter of the project, as its proposed outputs are particularly aligned to South Australia's Strategic Plan 2007 Soil Protection Target (T3.3). The Department is collaborating with Natural Resources

Management boards and The Department for Environment and Heritage (DEH) across South Australia to allow for a participatory approach to ongoing product validation. Currently, DAFF has funds to invest in this project until June 2013.

### Objectives

At this beginning stage in the project, the objectives are to involve all jurisdictions and provide the opportunity for agencies and Natural Resources Management boards to participate in field work training. Field data collection and ongoing ground measurements of fractional cover will be used to validate and calibrate image products. The current focus sites for training are cropping areas and in the rangelands.

### Methodology

The project will develop "fractional cover" maps based on the method developed by the CSIRO. Fractional cover refers to differentiation between the ground cover fractions of photosynthetically active and non-photosynthetically active vegetation and bare soil which is the key to improving estimates of erosion risk. Fractional cover products are derived from remote sensing imagery (MODIS imagery at 500 metre ground resolution) and will have national coverage.

A workshop held in November 2009 on 'Ground cover monitoring for Australia – a nationally coordinated approach to ground cover mapping' recommended the adoption of Queensland's field methodology for measuring fractional cover, as used in the Statewide Landcover and Trees Study (SLATS), to validate the maps. SLATS training will be held in cropping sites and rangelands sites in July 2010. Crop training sites are located near Jamestown whereas rangelands site are located north of Orroroo. Training will involve hands-on experience in site selection, site description, use of equipment and the method for measuring groundcover. The focus is on validating the ground cover product in areas with a low woody vegetation component or <15% foliage projective cover, under pastoralism in the rangelands.

### Discussion

The groundcover project formally commences in July 2010 and as such, the Spatial Information Day presentation will provide:

- (1) an overview of the project and its relevance for South Australia;
- (2) the SLATS groundtruthing methodology;

and  
(3) the outcomes of the SLATS training undertaken in July 2010.

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### Environmental Zonation Across the Australian Arid Region Based on Long Term Vegetation Dynamics

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**Session: Environmental Management**

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**Presenter: Erika Lawley**

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**Time: 3:45pm**

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**Room: 10 & 11**

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Zonation of landscapes into units with characteristic climate, landforms, soils and vegetation provides a necessary foundation for survey and management. Such stratification, when based on biophysical properties and environmental associations, represents a static view of the environment and does not reflect the dynamics and function of the landscape. In arid landscapes in particular, erratic climatic events cause landscape response which may be expressed over long periods of time and not readily discerned through the field surveys and imagery that form the basis of current stratifications. For interpretation of the landscape, and for management, it is important to understand the underlying long term dynamics of the environment.

The aim of this research is to understand the dynamics and functional response of vegetation in the Australian arid zone and use this to inform, and potentially improve, current stratification of the region. Specifically this study sought to identify the underlying factors influencing patterns of Australian arid vegetation growth and identify regions of similar long term response.

Analysis of 25 years of satellite imagery revealed the major patterns of vegetation growth throughout the region. Dominant factors of variation were identified as the spatial distribution of total vegetation growth, seasonality of growth, magnitude of seasonal variability in growth and regularity of variation in growth. In addition to these dominant factors a considerable percentage of the variation resulted from episodic vegetation growth of limited spatial extent and duration.

Classes expressing these functional components were compared with the existing biogeographical regions, revealing agreement in some instances, and in other cases adding information previously not

available. The study demonstrates a new approach to landscape zonation that has potential for much wider application.

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### The status of the National GNSS Networks and their Impact on National Geodesy

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**Session: Surveying and Measurement**

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**Presenter: Gary Johnston**

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**Time: 3:15pm**

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**Room: 3**

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In Australia the national network of GNSS Continuously Operating Reference Stations (CORS) provide the fundamental framework for all spatial activities and the linkage to the International Terrestrial Reference Frame (ITRF). Importantly, this national network also contributes data and products to the Global Geodetic Observing System (GGOS) for use in a variety of science applications.

The Geocentric Datum of Australia 1994 (GDA94) was based on observations (1992 – 1994) from a sparse network of CORS called the Australian Fiducial Network. The resultant coordinate datum was estimated to have an uncertainty of 3cm horizontally and 5cm vertically at the AFN stations. Since that time the demand for higher accuracies has resulted in GDA94 no longer adequately serving user demand. The ITRF has continued to evolve in accuracy and distribution to the extent that it now allows very accurate measurement of linear and non-linear crustal deformation. Even the Australian Plate, which for GDA94's implementation was considered rigid, is now known to be deforming at levels detectable by modern geodesy.

Consequently, national infrastructure development programs, such as AuScope, have been implemented to ensure that crustal deformation can be better measured. The AuScope program also aims to improve the accuracy of the ITRF by contributing to the next generation of the GGOS in our region. This approach will ensure that the ITRF continues to evolve and that Australia's National datum is integrally connected to it with equivalent accuracies. This paper reviews the status of National CORS networks and their contribution to GGOS and its impact on positioning in Australia.

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## Visualisation and Analysis of Lidar

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**Session: Surveying and Measurement**

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**Presenter: Gordon Sumerling**

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**Time: 3:45pm**

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**Room: 3**

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Lidar data is becoming more common in the GIS world. Like digital aerial photography, there has been an explosion in available sensors and data providers, leading to an increase in the volume of data being captured and an increase in frequency of data capture.

However, the increased amount of Lidar data available raises a number of important questions:

- What is Lidar?
- How should this data be stored?
- How can this data be analysed to provide meaningful results?
- What are best methods to supply this data to a wider audience?

This presentation will take attendees through the key steps; from converting Lidar data to different formats, methods to visualise and interpret the Lidar data, and how the data can be disseminated to non geospatial analysts.

