Spatial Data Analysis Network

NEWSLETTER

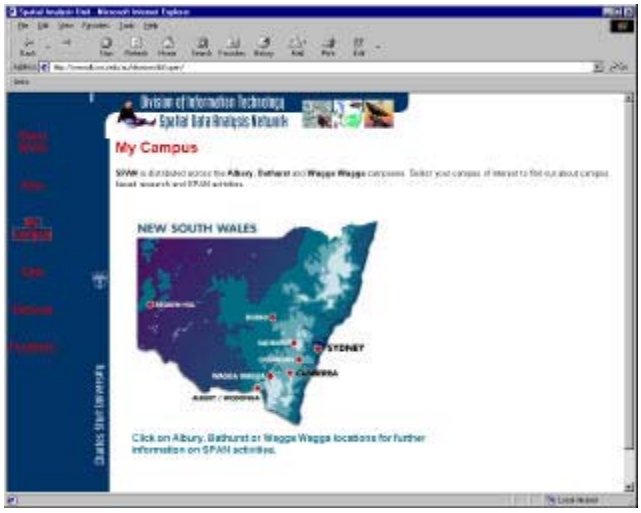
February 2001

Mission Statement: "To achieve excellence in the application of innovative spatial analysis in support of research,education and community outreach."

Redesign of SPAN Website Underway …

Have you had any difficulties locating information on SPAN's website? We have !!! As a result, SPAN is currently undertaking a restructure of the SPAN website. This restructure will result in a simplified menu system, less images and a conversion to the CSU standard look and feel for websites.

The new simplified structure will contain 6 menu options: **About SPAN**, **New**, **My Campus**, **Data**, **Services**, and **Feedback**. All new items added to the site will appear in the **New** section first. The **My Campus** area will provide you with information on what's happening locally at your campus. For example, user group meetings, research, seminars and special events.



As part of this process, a feedback form will be incorporated to allow you to comment (anonymously if you wish) on SPAN's services, activities and the website design and content. Forms will be provided to allow you to order SPAN services online, for example:

- Requests for research assistance
- Accounts on SPANW
- Software
- Training
- Printing and scanning services

Please contact your local SPAN officer if you have any comments. The restructure is scheduled for completion on 30 March 2001. Be sure to check out the site after this data at http://www.csu.edu.au/division/dit/span.

SPAN applies for Natural Heritage Grant

Mr Craig Poynter, SPANs' Spatial Analysis Officer at Wagga Wagga, in conjunction with Junee Shire Council, recently applied for a Natural Heritage Grant to undertake a study of wildlife corridor inventory and connectivity within the Junee Shire comprising the catchments of Houlaghans, Billabung, and Wantiool Creeks.

The aims of this project will be:

- detection of vegetation using SPANs recently acquired Landsat 7 imagery (see Landsat article this newsletter),
- assessing the connectivity of vegetation through modelling within a GIS,
- and producing resources that land managers can utilise in natural resource management.

In determining vegetation connectivity within the Junee area, a list of priority sites will be developed to indicate those sites that maximise the number of vegetation corridors linked. The importance of developing vegetation

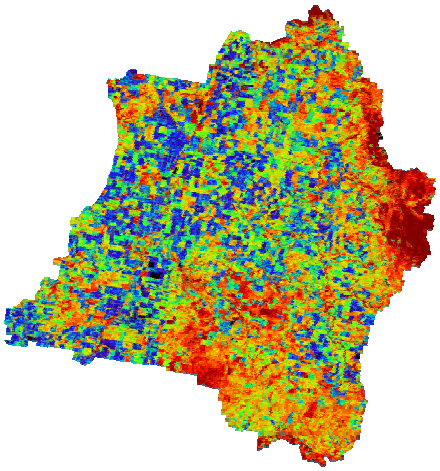
networks not only allows for the dispersal of vegetation genetics, but allows for dispersal of isolated populations of fauna through alternative routes.

Other CSU staff involved with this project includes Dr Helen Wood and Mr Paul Frazier (School of Science and Technology) and Ms Siti Amri (Manager - SPAN).

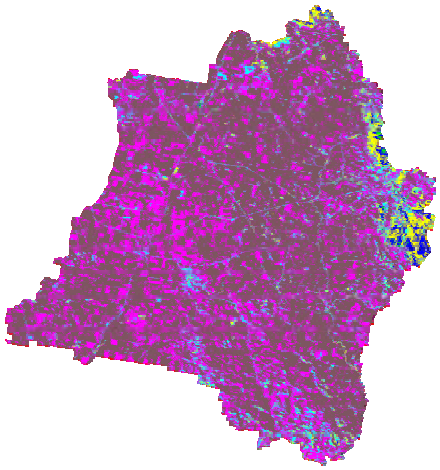
To view the application visit wwwdb.csu.edu.au/division/dit/span/mycampus/wagga.htm.

Notification of the grants application will be October, 2001.

True Colour Image



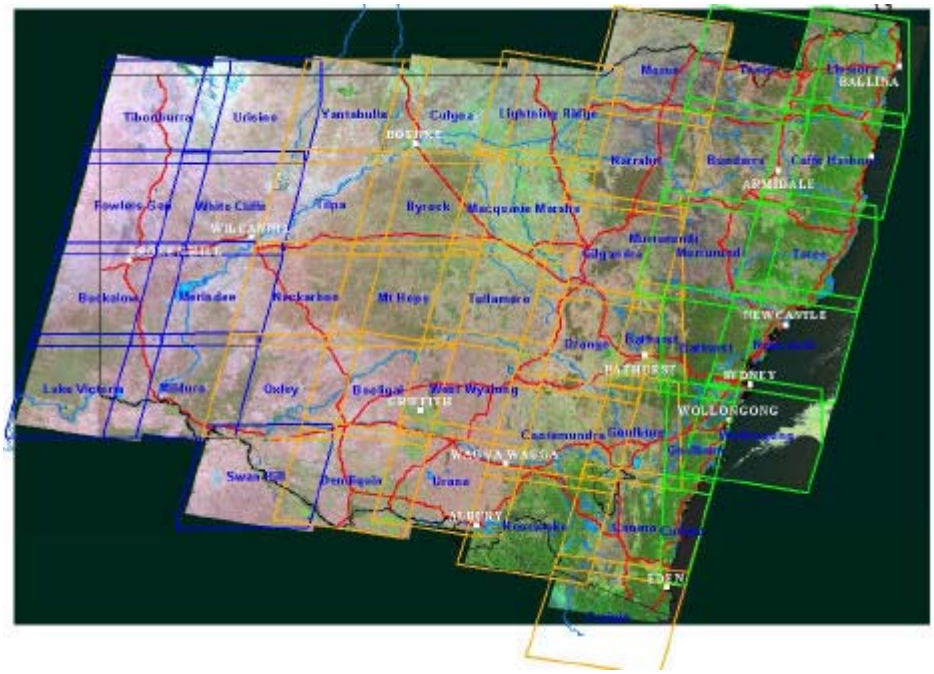
NDVI Image



Unsupervised Classification Image

Landsat 7 Dataset Now Complete …

The 2000 acquisition of Landsat 7 data is complete, with all 39 images making up the entire NSW coverage now available on SPANW (/data/rs/landsat). If you do not have an account on SPAN's Wagga based Unix machine, please contact your local SPAN officer.



The ENVI remote sensing software package is available either on SPANW or locally at each campus to analyse these data. The vendor's on-line training material is available to introduce you to the software (start Envi, on the menu bar click "help", then click "Using ENVI" etc…).

The School of Science and Technology is producing a set of 6-7 practicals, integrating local data, to help researchers learn the ENVI software. These practicals are due for completion in April. SPAN will revamp the material to fit in as a two-day Remote Sensing workshop. SPAN staff will advise when these materials are finalised. Remote sensing seminars will be held, if required, to assist researchers wishing to use remotely sensed data. Seminars are scheduled for **Bathurst** and **Albury/Thurgoona** campuses on 27 March 2001 and early April (tentative) respectively. Please check on the SPAN website at **My Campus** for details.

Additional Data Now Available …

Data Agreements

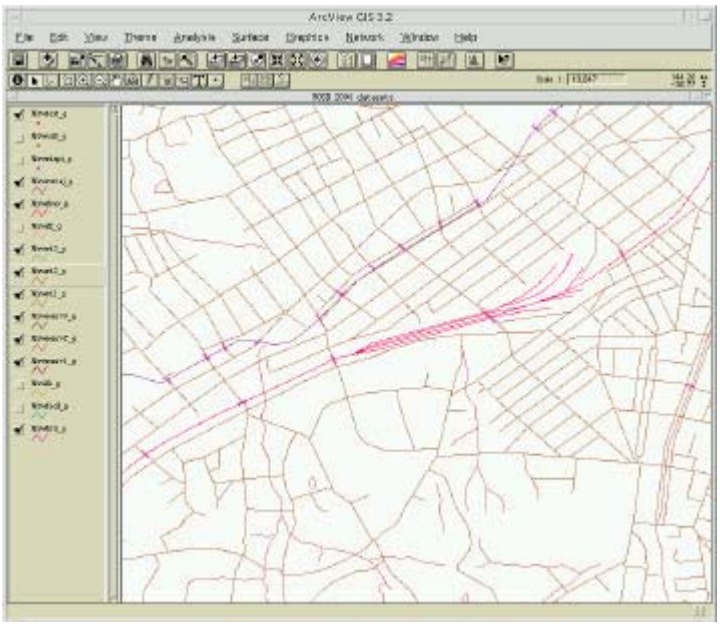
Recent negotiations with local agencies have resulted in a number of Data Agreements being negotiated. In particular, agreements have been made with the Department of Land & Water Conservation, NSW State Forests and Bathurst City Council. These organisations will provide data, free of charge, to researchers at CSU. A project proposal/overview, and copies of published papers and results, must be forwarded to the organisation as part of the agreement.

Information on data available may be obtained from the NSW Data Directory (nrims.nsw.gov.au/nrdd/) Online. Alternatively, contact your local SPAN officer to discuss your data requirements. All requests for data must be made via the SPAN officer at your campus.

ROSD 2000

SPAN has recently received an update of the **Reduced Output Standard Database** for NSW. Feature types included in ROSD are:

- Sealed and Other Roads
- Unsealed Roads
- Coastlines
- Major Hydrography
- Bridges
- Crossings
- Ferries, Railways & Stations
- Lakes
- Airports
- Parks and Reserves
- Localities
- Cultural Points
- National Parks



ROSD data as a consistent coverage and is considered current as of November 2000. SPAN has completed the translation of the data from Mapinfo to Shape format and reprojected from AGD66 to GDA94.

This data can make a valuable addition to your research project and is available by contacting your local SPAN officer.

Infrastructure Block Grant 2001 application …

Handheld Spectroradiometer

SPAN is submitting a grant proposal for a Handheld Spectroradiometer, which is a field portable instrument used in the measurement of light. This instrument splits incident light into approximately five hundred separate narrow bands within the range of 325nm to 1075nm.

Example research applications for this instrument are in the areas of ecology, remote sensing, chemistry, viticulture, and assisting in spectral calibration of SPANs airborne video imagery system.

Consultancy software

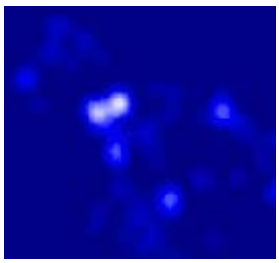
SPAN is submitting a grant proposal to purchase commercial licences for its' current research supported software (ie. ArcInfo / ArcView / ENVI / Splus) in addition to upgrade software to be used in conjunction with Trimble GPS units.
The availability of commercial software licences will permit CSU staff to participate in commercial applications without breaching current licencing agreements with software vendors.

The acquisition of upgraded Trimble GPS software will improve the ability to process data collected using two geodetic GPS units, which currently is limited to processing on Win3.x operating system. The upgrade software will conform to the current NT operating system used by CSU.

Barking Owls …

Researchers: Natasha Schedvin, Iain Taylor, Matthew Herring – School of Environmental and Information Sciences, Simon McDonald – SPAN

Project:
Two projects have taken an interest in the "Barking Owl". Natasha Schedvin's PhD project has been incorporating the free downloadable Animal Movement" extension available for Arcview. Natasha is studying the habitat requirements of the owl. Iain Taylor and Matthew Herring are also undertaking a research project with respect to Barking Owls/Owls in general. Their project is studying where the owl's nests are located and the numbers of the species left in the wild.



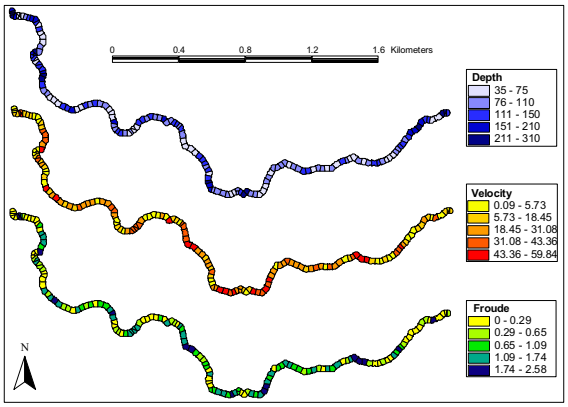
Home Range Analysis

Barking Owl

Golden Perch and Common Carp …

Researchers: David Crook – Johnstone Centre / Murray Darling Freshwater Research Centre Simon McDonald – SPAN

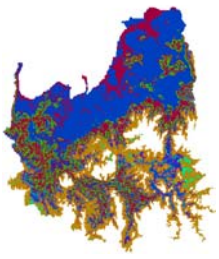
Project:
David Crook's PhD project into the habitat requirements and home range of Golden Perch and the Common Carp have also used the Arcview Extension mentioned above. Recent analysis has included proximity analysis to determine discrete polygon boundaries representing depth, velocity and Froude measurements in the rivers. These values are going to be used to see if there is a reason why each species of fish take up particular residences in the river.

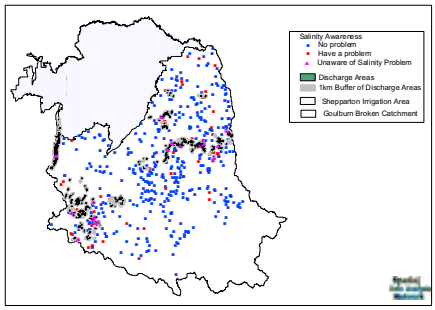


Dryland Salinity …

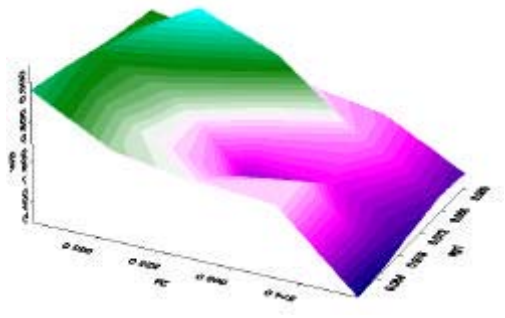
Researchers: Allan Curtis, Jacinta MacKay, Marike Van Nouhuys, Michael Lockwood, Ian Byron, Megan Graham, Liza Price – Johnstone Centre Simon McDonald – SPAN

Project:
GIS analysis with Allan Curtis' project regarding landholder willingness and capacity to manage dryland salinity, has included analysis of where there are farmers who say they do not have a salinity problem yet there is salinity discharge within 1km of their property. Present analysis also includes consideration of the groundwater table.





Statistics …



Researchers: Laurie Chisholm – University of Wollongong
Simon McDonald – SPAN

Project:
A script has recently been developed for a remote sensing application – 'Automated Analysis of Spectral Indicators' in S-Plus. This script will read in a dataset and perform stepwise linear regression taking into account (fully) multicollinearity and produce a model based on these indicators.
Potential users – Remote Sensing researchers analysing hyper-spectral data or anyone doing multivariate research. The script will be made available to external users for cost of transfer.

Reference Materials …

SPAN has available for short term loan the following reference materials:

- Murrumbidgee Catchment Management Committee (1998) *Murrumbidgee Catchment Action Plan: for integrated natural resources management*.
- Department of Land and Water Conservation (1998) *Rural production and native vegetation conservation information for landholders*. New South Wales Government.
- Department of Land and Water Conservation (2000), *NSW Salinity Strategy: Salinity Targets Supplementary Paper*. New South Wales Government.

Australian Association for Social Research Annual Conference, Wollongong, 17th-19th May, 2001

The conference will comprise four multi-disciplinary and interdisciplinary streams to reflect the different approaches occurring in social research.

One stream of the conference will focus on the use of GIS in social applications. SPAN will be co-ordinating the GIS stream of the conference with Prof. Graeme Hugo from GISCA (www.gisca.adelaide.edu.au/gisca/) giving the keynote presentation for this stream.

Prof. Hugo will be in Wagga on Monday, 21st May (Monday following conference) to conduct a series of workshops with the Centre of Rural Social Research(CSU).

Researchers or people interested in this area should attend. Conference details are available at www.csu.edu.au/research/aasr. To view the conference brochure visit wwwdb.csu.edu.au/division/dit/span/aboutspan/ and enter our newsletter link to the February newsletter.

Submission of conference papers for GIS and social research integration can be forwarded to Ms Siti Amri at samri@csu.edu.au.

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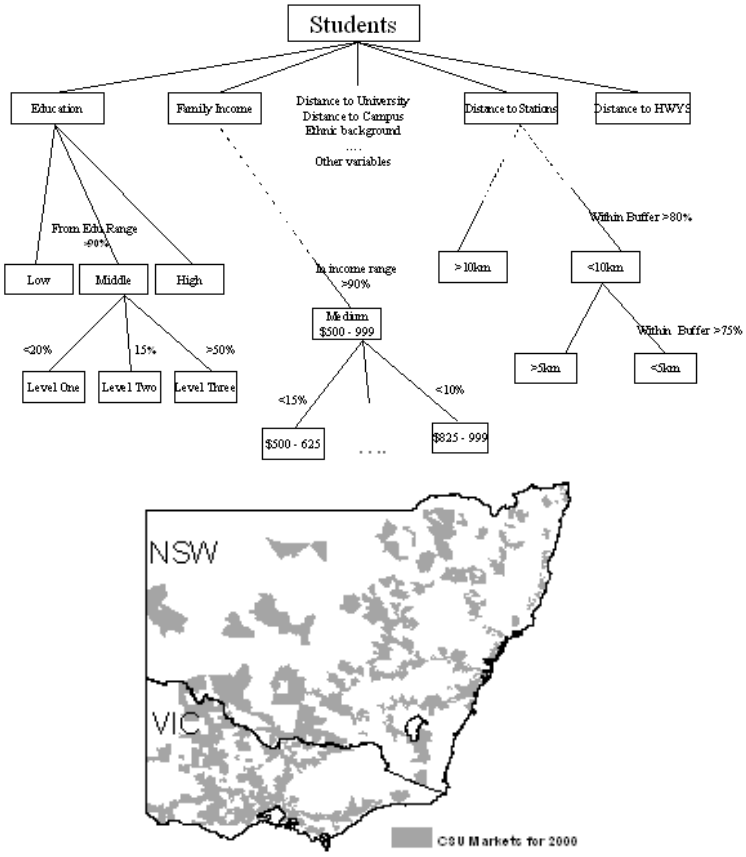
Spatial Data Mining

Researchers:
Maria Tang – School of Environmental and Information Sciences, Simon McDonald – SPAN (co-author).

Project:
Two publications have been produced based on research incorporating Spatial Data Mining and GIS.

An algorithm has been developed to identify areas where CSU marketing specialists can concentrate their resources to maximise their student enrolment catchment. The studies use GIS, spatial statistics, and spatial data mining techniques to explore the associations between students and their demographic characteristics.

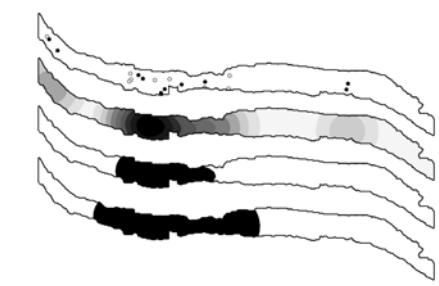
For copies of these papers please visit SPAN's website

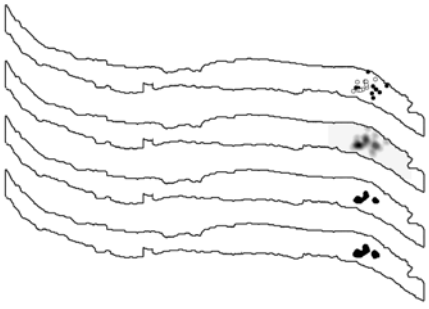


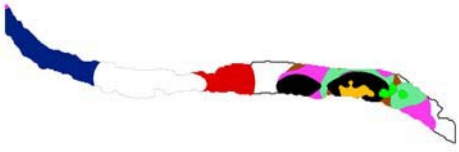
Golden perch and Common Carp

Researchers:
David Crook – Johnstone Centre / Murray Darling Freshwater Research Centre
Simon McDonald – SPAN (assistant)

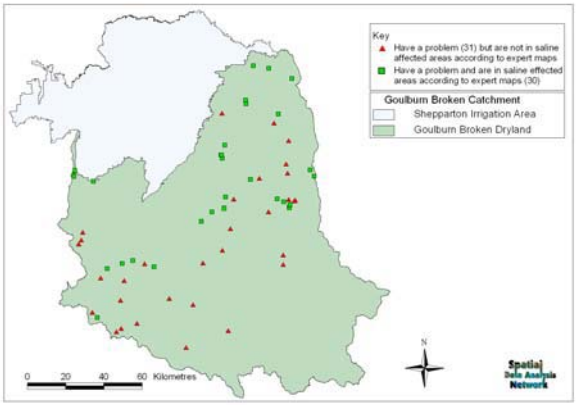
Project:
GIS interpolation techniques are used to analyse habitat requirements and home range of Golden Perch and the Common Carp. The analyses attempt to determine to what extent the home ranges of the two types of fish overlap/intersect, hence making inference about the lives and environment of the two species.







Dryland Salinity



Researchers:
Allan Curtis, Jacinta MacKay, Simon McDonald – SPAN (co-author)

Project:
This project examines landholder awareness and responses to dryland salinity. GIS is used to integrate data from mail survey including discharge sites and depth to saline ground water. The study indicates that farmers' opinions of salinity differ to that of the expert maps produced by the Murray Darling Salinity Audit. The research findings have important policy and management implications.

Remote Sensing Statistics

Researchers:
Laurie Chisholm – University of Wollongong, Simon McDonald – SPAN (assistant)

Project:
SPLUS statistical software is customised to performed standard remote sensing statistical analysis, to find and create spectral indicators script. This tool is developed as part of a larger project in the analysis of spectroradiometric data of *Pinius radiata* with and without 'needle blight', that enables the use of the portspec data converter from any non - 8.3 directory structure TO any non - 8.3 directory structure and then performs.

This SPLUS extension will be made available to Remote Sensing researchers at cost of transfer.

Software

Envi 3.5

Research Systems have released an upgrade to their Envi software package. This is SPAN's supported remote sensing package. The new version is already installed and in use on SPANW. Users of the PC version of Envi should contact SPAN for an update if required.

ArcGIS 8

This release provides added functionality for advanced geoprocessing and data conversion capabilities that make GIS data creation, update, query, mapping, and analysis more user friendly.

ArcGIS 8 for CSU is composed of ArcInfo 8.1 and ArcView 8.1. ArcInfo is the most functionally rich client. It includes all the functionality of ArcView plus advanced geoprocessing and data conversion capabilities.

ArcGIS 8 is major upgrade to the PC environment. No major upgrade has been performed for the UNIX environment.
SPAN staff are currently familiarising themselves with ArcGIS 8.

S-Plus 6 has arrived!

S-Plus 6 has arrived for both the UNIX and Windows platforms.

On the UNIX platform, S-Plus now has a Java interface. This gives the user the opportunity to create user friendly graphical user interfaces (GUI) for their statistics/mathematics/programming on UNIX using S-Plus' built in Java interface (besides the C and Fortran interfaces that already exist).

The most exciting advancements can be found on the PC version however. S-Plus 6 for Windows now utilises direct C++ calls for its GUI Objects making them considerably faster. S-Plus 6 for Windows also allows you to open an Excel file from within S-Plus. This means you can use all the Excel functions and formulae as well as the full statistical power of over 4500 S-Plus functions on your Excel data! Excel is fully integrated into the S-Plus package. This is offered by none of the other mainstream statistics packages.

Charles Sturt University has a site license for this amazing software. If you would like to obtain it for use in your research please contact your local SPAN representative.

***News*:** S-Plus is now owned by a company named 'Insightful'. It used to be owned by Mathsoft.

ArcSDE (Spatial Data Engine)

During October, SPAN staff at Wagga Wagga and Albury/Thurgoona began initial testing of ArcSDE. ArcSDE is the GIS gateway that facilitates managing spatial data in a database management system. ArcSDE allows management of geographic information in one of four commercial databases: IBM DB2, Informix, Microsoft SQL Server, and Oracle, as well as being able to serve ESRI's file-based data with ArcSDE for Coverages. ArcSDE serves spatial data to the ArcGIS Desktop (ArcView, ArcEditor, and ArcInfo) and through ArcIMS, as well as other applications and it is the key component in managing a multi-user spatial database.

It is envisaged that SPANs' spatial (imagery and vector/raster) and tabular (ie. Census) data will be accessible to users by using ArcCatalog or ArcMap (see earlier item).

Initial testing of a small database containing census boundary maps, census tables and airborne video imagery has provided positive results.

Tektronix Phaser 850DX

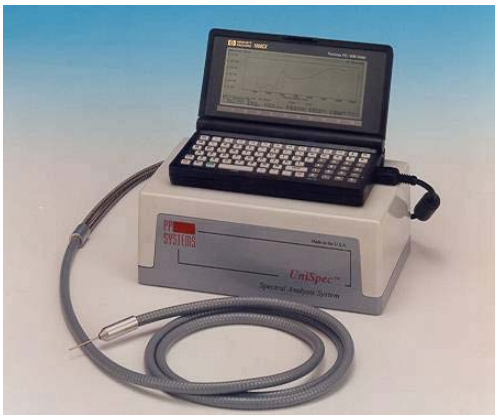
During June, SPAN received delivery of a Tektronix Phaser 850DX colour solid ink printer. Benefits of this new printer include:

Job accounting software - provides an individual cost per printing job.
Environmentally friendly - use of non-toxic solid ink blocks instead of laser toner or liquid inks.
Speed - approximately three times faster than some laser printer.
Print quality - reliable reproduction of your document whether you print it today or next week, the same quality document is produced. This printer allows for duplex (back to back) printing and quality transparency printing.

To date this printer has been utilised extensively for printing SPAN training materials, research documentation, conference resources and a number of research theses.

Contact the SPAN staff member at your campus if you would like to see the quality of documents produced from this printer and to organise printing of your documents.

Spectroradiometer



The new spectroradiometer has been through a tender process and PP SYSTEMS was the successful vendor. Their Unispec Spectral Analysis system was selected. This instrument is designed with in field plant measurements in mind. It has an integrated light source and leaf clip for plant measurements. When coupled to the Windows CE palmtop, early next year, it will be a very portable easy to use instrument. Delivery is expected in early December. The final items ordered include-:

PP SYSTEMS Unispec spectroradiometer
Leaf clip
2 and 12 degree FOV lenses with radiometric calibration
cosine receptor with radiometric calibration
5m underwater fibre optic cable (for use with cosine receptor)
Dip probe with 10mm pathlength tip
4 way 1cm cuvette holder
Casio Windows CE palmtop and Uniwin software (early 2002)

MADIS

Development of MADIS continues. A false colour image from a test flight on the 31st of August is included. Another flight is scheduled for early December. We hope that MADIS will be judged fully operational early in 2002. Image correction algorithm development will continue and the new spectroradiometer will allow for work to begin on radiometrically calibrated imagery.

New South Wales 9 Second DEM

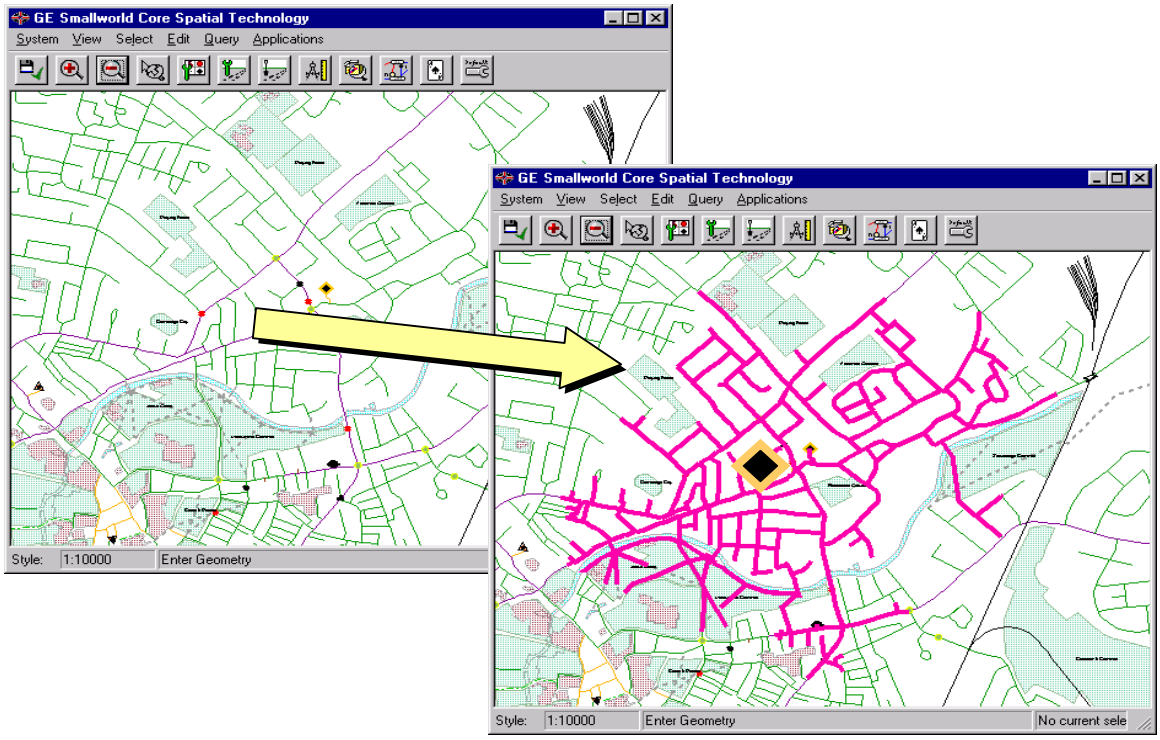
9 second Digital Elevation Model (DEM) for NSW. A DEM is a three dimensional representation of the Earth's surface, usually constructed in the form of a regular grid with elevation points spaced at a regular interval. This gridded DEM was computed from topographic information including point elevation data, elevation contours, streamlines and cliff lines. The grid spacing is 9 seconds in latitude and longitude (approximately 250 metres).

The elevation of source data high points (hills and mountains) is well represented and lends itself to a wide range of applications where accurate representation of absolute elevation values is needed - large scale projects for example such as planning the siting of signal transmitters and receivers by communications companies.

Further information can be found by visiting the AUSLIG website. The above image was created using the new DEM data, Landsat 7 imagery purchased during 2000, Envi 3.5 and ArcGIS 8 software.

GE Smallworld

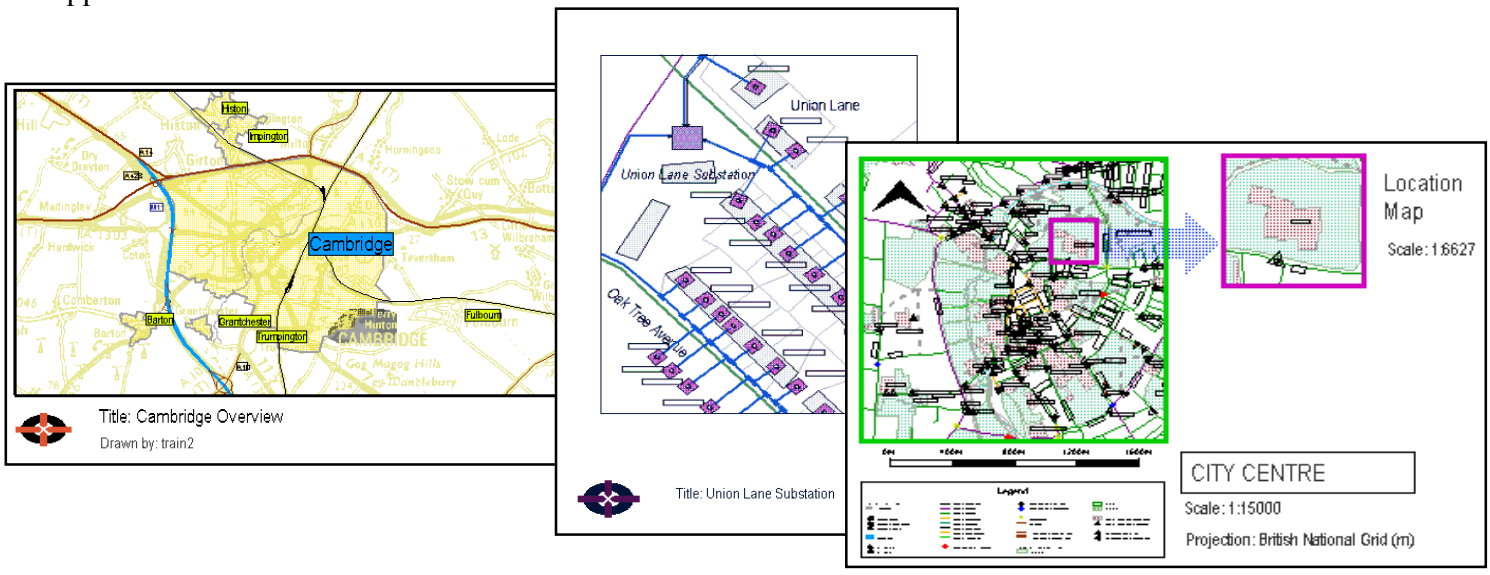
GE Smallworld creates, markets and deliver network software products to the Utility and Public Systems and Communications markets globally. GE Smallworld's products model real world assets and services, enabling companies to understand where their facilities and customers are located and how they are connected, then seamlessly integrating this information across the enterprise. GE Smallworld provides rapid implementation and integration of GE Smallworld's uniques object-oriented technology and vertical industry solutions, which can increase customers' revenues, improve customers service, and better utilize assets.



The SPAN unit has obtained a 10-seat license of GE Smallworld software for use in teaching and research applications. There will be 3-day training conducted in Wagga Wagga between 28-20th November, 2001.

Participants will achieve the following learning outcomes;

- ☑ Familiarity with using Core Spatial Technology as a user.
- ☑ A basic knowledge of how to configure GE Smallworld applications.
- ☑ An understanding of the main functions of database administration.
- ☑ An appreciation of the various facilities available for designing and implementing a GE Smallworld application.



REROC

2001 was another successful year of SPAN working with REROC (Riverina Eastern Regional Organisation of Councils). Highlights during the year included:

- ☑ introductory training for ten council staff using Mapinfo GIS
- ☑ discussions for development of intermediate Mapinfo training
- ☑ SPAN staff familiarisation with REROC Trimble GPS (utilised during project with Junee Shire Council)
- ☑ assisting with a regional database naming convention for spatial data.

SPAN Contact details:

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Fax: 84298

Wagga Wagga

Phone: 32165
Fax: 32735

SPAN Website: wwwdb.csu.edu.au/division/dit/span