

## ACRES New Range of SAR Products



GUEST PRESENTERS AT THE ERS SAR SEMINAR SERIES HELD LATE LAST YEAR WERE GAUTE SOLAAS (LEFT) FROM ESRIN, ITALY, AND ROB SCHUMANN (RIGHT), ESA'S SOUTH EAST ASIA REPRESENTATIVE.

ACRES is now offering a new range of Synthetic Aperture Radar (SAR) products. These products are available in a greater variety of processing levels than previously available, allowing customers to choose a product more suited to their needs.

SAR data is unlike optical remote sensing data in that images can be acquired through cloud, smoke and haze. Interpretation of SAR data is also different to that of optical data.

Initially ACRES will only be processing SAR data it acquires from the European Space Agency's Earth Resource Satellite (ERS). The ERS satellites have

been orbiting Earth for over 5 years, during which time ACRES has accumulated a comprehensive archive of about 24,000 scenes over Australia, New Zealand and most of Papua New Guinea. Each scene is about 100 km x 100 km, and can be framed anywhere along the path of the satellite. ACRES is currently working on the processing of SAR data from the Japanese satellite, JERS.

The new range of SAR products has been available since 1 January 1997, thanks to the installation of ACRES' new Synthetic Aperture Radar Processing System, purchased from Vexcel Corp of Boulder, USA.

At this stage the most popular product is likely to be the "Bulk Path Image Product" which has a high degree of radiometric and geometric processing. By April this year additional products will also be available.

For more details, please contact ACRES, your ACRES Distributor or refer to the ACRES web pages on <http://www.auslig.gov.au/acres/index.htm>.

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## Manager's Message



I have been Acting Manager of ACRES while Paul Trezise is Acting Assistant General Manager for AUSLIG. Although the appointment was initially for three months in August 1996, the extended period of appointment has allowed me to participate more extensively in ACRES' strategic planning processes, as well as operational activities.

There are certainly many exciting issues facing ACRES at the moment. There will be an explosion of new high-resolution satellites within the next two years, and decisions need to be made by ACRES which require a detailed risk analysis. The market for radar imagery is still in its infancy in Australia, and ACRES needs to work closely with value-adding resellers and users to make sure that this important source of data is fully exploited. ACRES is also involved in the ARIES project, a major project on the international scene which has a unique marketing profile and tremendous potential.

Internally, ACRES is planning to maintain its leading position as a quality provider of data to users. Developments will include the upgrading of our reception facilities to enable, among other things, viewing of the data catalogue within one day of reception. A new processing system will improve delivery times for all products, and will provide flexibility to add additional satellites. A media-server project now under way, will allow more flexible input/output, including CD-R. The catalogue system is being upgraded to include the improvements requested by users since its release a year ago.

I am excited to be able to assist with these projects which will bring such benefits to all users of remote sensing data.

*Ian Shepherd*

## Editor's Note

*Jim Mollison*

You will notice that this edition of ACRES Update is the first to have an Issue Number quoted on the front cover. This will help all recipients of ACRES Update to maintain an accurate chronological record of issues received.

Articles for publication in ACRES Update are gladly accepted from a variety of sources. Please forward any relevant articles to "The Editor, ACRES Update" at the address shown on the back cover.

Thanks is extended to all those who provided articles for this edition, and to our in-house photographers Anton Albina and Col Ellis.

## ERS SAR Seminars around Australia

During September 1996, ACRES, our Distributors and the European Space Agency (ESA) conducted a series of information seminars around the country on ERS SAR data. Seminars were held in Perth, Adelaide, Melbourne, Canberra, Brisbane and Sydney.

We were fortunate in having two expert speakers from ESA. The first was Rob Schumann, ESA's South East Asia Representative, who spoke about basic SAR theory, practical data handling techniques, common difficulties and how they can be overcome, and ways to manipulate, combine and display data for real applications.

The second speaker was Gaute Solaas from ESRIN in Italy. ESRIN is that part of ESA concerned with ERS SAR data. Gaute is a SAR applications expert, and his seminar presentation compared ERS SAR to other SAR sensors, and described numerous ERS SAR applications.

Jim Mollison from ACRES also spoke briefly about ACRES large SAR archive, the status of ACRES' new SAR processing system, and some of the products that would be available.

ACRES Distributors at each location supported the seminars by organising venues, providing refreshments and attracting attendees.

The seminars were well received by the majority of people who attended. Most attendees were relatively new to SAR technology, so the seminars provided some useful grounding for future learning.

## Restructuring of AUSLIG

*Ian Shepherd*

In our last edition of ACRES Update, we reported that the Federal Government had reaffirmed AUSLIG's continued program responsibility for remote sensing. The way in which ACRES' services are delivered is not being changed. However, many of AUSLIG's other service delivery mechanisms are being market tested, and this process has now become well advanced.

An Invitation to Register Interest in the purchase of AUSLIG's commercial activities (primarily surveying and customised mapping) has been issued, and a shortlist of 11 groups has been selected to respond to a Tender. It is expected that the sale process will be completed by the end of May this year.

A Tender for the market testing of AUSLIG's map and (non-remote sensing) data production will be issued in March, with the outcome decided in May 1997.



Requests for Proposals for the market testing of AUSLIG's distribution arrangements for non-remote sensing data, and the delivery of satellite laser ranging services will be issued in April 1997.

A restructuring of AUSLIG is also taking place, in order to reflect its new program management focus. This restructuring will be complete by the end of June 1997.

## ACRES new ERS SAR Processing Levels

At this stage (February 1997), ACRES new SAR processing system allows us to produce the following processing levels. (The three character codes, in brackets after each name, are the codes used by the European Space Agency.)

### **ANNOTATED RAW DATA (RAW)**

This data is minimally preprocessed raw SAR data suitable for input into other SAR processors. It is mainly used as a ground station interchange format or by research institutes interested in full SAR data processing. Such data cannot be ingested by an image processing system.

### **SINGLE LOOK COMPLEX DATA (SLC)**

Data at this processing level is mainly used for interferometry (DTM generation) and for the development, calibration, testing and use of SAR algorithms. The data are "slant range" which basically means that relationships between observed objects are based on time differences between radar pulses. (This is in contrast to other processing levels in "ground range", meaning that observed objects are spatially related to the Earth as an approximate flat image.)

### **BULK PATH IMAGE (PRI)**

This is a path oriented and system corrected product, being the basic product used for a variety of remote sensing applications. This product is noise reduced (4 looks) which results in less speckle on the image. The four looks also help to achieve the equal sized square pixels. The data is able to be calibrated by use of a calibration constant supplied in the header file of the product.

### **ADDITIONAL PROCESSING LEVELS**

Additional processing levels will be progressively available from ACRES, with the next level due for release in April 1997. It will be system corrected but rectified to a map grid.

## ERS SAR Research and Demonstration Purchasing Category

ACRES has implemented a special category for potential customers of ERS SAR data who wish to use the data for research and/or demonstration purposes. This category has been established according to ESA guidelines whereby customers can purchase data at a reduced price if their usage is in accordance with the criteria listed below. The offer is available only for ERS SAR *digital* data.

1. The data shall be used for specific projects such as:
  - scientific research;
  - demonstration, education or training;
  - development of *new* algorithms, products or applications.
2. In addition to the above points, the usage of data must be non-commercial (eg. no financial return from the use of that data) and non-operational (eg. not part of normal operating procedures).
3. A final report stating the major results of the project must be provided to ACRES. ACRES may choose to summarise this report for publication.
4. The number of data products allowable per project will be restricted to the minimum number of scenes necessary for achieving the project's objectives. ACRES will have the final decision on the number of scenes made available.
5. In return for receiving this reduced priced data, the customer must agree to contribute to the promotion of the ERS Programme and its application, eg. presentation of results in conferences, where appropriate; provision of inputs for the production of ERS application fact sheets; articles for ACRES publications.
6. ESA and ACRES shall be acknowledged as the data source and distributor in any publications.
7. The data is to be used only for the above mentioned purposes and there may be no onward transmission to Third Parties.

Applications for purchasing data under this category must be made on the "ERS SAR Research and Demonstration Usage Project Form". Applications will be considered on a case by case basis, with no guarantee of reduced pricing being granted. Copies of the R&D Usage Project Form and other related details are available from ACRES, our Distributors or from ACRES web pages at:

[http://www.auslig.gov.au/acres/prod\\_ser/ers\\_r&d.htm](http://www.auslig.gov.au/acres/prod_ser/ers_r&d.htm)

## SAR Research with UNSW

An Agreement has been signed by ACRES with the School of Geomatic Engineering, University of New South Wales, that will enable UNSW to use the facilities of ACRES for processing SAR data, and test the quality of elevations determined from the data. Mr Majid Mirbagheri, a postgraduate student, will be working with Craig Smith and other ACRES staff on this project. As well as testing ACRES' new SAR processing system in a non-standard application, both parties expect to benefit by a clearer understanding of the potential application of SAR interferometric data in mapping.

## Synthetic Aperture Radar Short Course

The University of NSW will soon be holding a short course on Synthetic Aperture Radar (SAR).

The course has been designed to provide a good understanding of the theory and application of radar remote sensing. This includes the nature of surface and volume scattering, image distortion and correction and an introduction to radar applications in agriculture, forestry, geology, oceanography, engineering, urban areas and mapping. Other topics will include an introduction to SAR signal and image processing, passive microwave remote sensing, radar interferometry, quad-polarised radar, polarisation signatures and backscatter modelling, and a special session on AirSAR and RADARSAT

**When:** 7-9 and 12-13 May 1997, from 9.00 am to 5.00 pm each day

**Where:** Room 136, 1st Floor Geography and Surveying Building, The University of New South Wales, Kensington, NSW.

**Presenters:** The course will be presented by Professor Bruce Forster (Theory), with specialist lectures by Associate Professor Tony Milne (Applications), and Dr Yunhan Dong (Post Doctoral Fellow and expert in radar backscatter modelling).

**Cost:** The cost of the course, including notes, tutorial and practical material, and morning and afternoon teas, is \$1000. Payments should be made to the Centre for Remote sensing and GIS, UNSW.

**For further information:** Please contact Professor Bruce Forster on 02 9385 4172 or Fax 02 9313 7493, E-mail B.Forster@unsw.edu.au.

## ACRES Annual Distributors Meeting

*John Payne, Retail Sales Manager*



JO PLUNKETT FROM QUEENSLAND'S DEPARTMENT OF NATURAL RESOURCES ACCEPTS THE GOLD AWARD FOR DISTRIBUTOR SALES FROM PAUL TREZISE, AUSLIG'S ACTING ASSISTANT GENERAL MANAGER.

Late November 1996 saw the gathering in Canberra of the ACRES Distributors for the annual distributor meeting. In line with previous meetings there was a good exchange of views in relation to sales and marketing, as well as detailed briefings on production and distribution issues.

An addition to this year's forum were briefings on strategic issues from representatives from EOSAT and ANTRIX Corporation on IRS imagery, the Swedish Space Corporation on RESURS imagery, and a telephone hook-up with RADARSAT International from Canada. This new agenda proved popular with all distributors and every effort will be made to continue this practice at future meetings.

The annual awards were also presented to the top sales achievers for 1995/96. The criteria used for calculating these awards were the total distributor data sales, excluding SPOT data sales. The three award winners were:

**Gold Award:** Department of Natural Resources, Qld

**Silver Award:** Geoimage Pty Ltd

**Bronze Award:** Remote Sensing Services, DOLA, WA

Paul Trezise, AUSLIG's acting Assistant General Manager, gave a briefing on the impact of the Federal Government's Budget on AUSLIG and ACRES operations. Distributors were pleased to hear that the impact on ACRES operations in particular would be minimal.

ACRES acting Manager, Ian Shepherd, provided an interesting session on the key issues and status of operations with regard SPOT, RESURS, TERSS, ARIES, RADARSAT, Landsat, EOSAT and IRS.





BOB WALKER OF GEOIMAGE RECEIVED THE SILVER AWARD.



RICHARD SMITH FROM REMOTE SENSING SERVICES, DOLA, WA, WAS PRESENTED WITH THE BRONZE AWARD.

Sessions were also provided on new products such as AUSLIG's GEODATA 9 second DEM, the proposed new Entry Level Product, and proposed developments for the ACRES digital catalogue.

The meeting ended with an open forum and a presentation from Richard Smith, Remote Sensing Services, WA, on proposals for X-band reception in Western Australia.

At the close of the meeting distributors were asked to complete a detailed questionnaire which sought their views on what they thought of the meeting format, and the range and type of agenda items. The purpose of the questionnaire was to provide greater focus to future meetings and to ascertain whether we were sat-

isfying distributor's needs. Analysis of the results has revealed that the current content and format were very well received with additional information requested on future marketing plans and proposed new products.

The opportunity to listen to and discuss issues with representatives from the satellite operators proved very popular and every endeavour will be made to ensure that this is continued for future meetings.

Following the meeting a relaxing time was had by all at the evening dinner, which had a decidedly Christmas theme.



THE FEMALE CONTINGENT AT THE DISTRIBUTORS' DINNER KINDLY ALLOWED RICHARD SMITH, DOLA, TO POSE WITH THEM FOR THIS PHOTO.

## Space Imaging acquire EOSAT

On 5 November 1996 Space Imaging and Lockheed Martin announced they had reached an agreement concerning the purchase of EOSAT, a Lockheed Martin company, by Space Imaging. Under the terms of the agreement, Space Imaging will acquire all of the assets of EOSAT through a new subsidiary – Space Imaging, the Earth Observation Satellite Co. (SII/EOSAT), which will maintain the existing distribution agreements EOSAT has with its global satellite imagery suppliers. These include agreements to distribute Landsat imagery, as well as exclusive agreements with the ANTRIX Corp. Ltd. of India, the commercial marketing arm of the Indian Space Research Organisation, to distribute its Indian Remote Sensing (IRS) satellite imagery – the best of which provides 5.8 meter resolution imagery.

“This is a major step in Space Imaging’s strategy to become the world’s preeminent supplier of earth information and derivative products and services”, said John Copple, Space Imaging’s chief executive officer. “The combination of imagery from a variety of sources – our own satellites, other satellites, and aerial photography sources – will enable us to satisfy the needs of a broad range of customers in a variety of businesses. EOSAT’s exclusive access to multiple satellite systems, as well as its archive of previously collected imagery, moves us much closer to fulfilling this goal”.

At the time of the merger, EOSAT was the largest US provider of the world’s primary sources of space-based remote sensing imagery of the earth for use in commercial, government, research and academic applications. The company evolved from being the US Government partner charged with commercialising the Landsat program, to a global earth observation and information company that has partnerships and alliances with many of the leading remote sensing enterprises worldwide.

The acquisition provides Space Imaging with an established international distribution network, customer base and highly capable workforce, and it makes the company one of the world’s largest suppliers of imagery and information products. This role will expand further when Space Imaging launches the world’s first commercial 1 meter resolution satellite, CARTERRA™, in late 1997. All the information the company produces will be available in GIS-ready, digital formats, as well as in hardcopy formats, to customers worldwide.

EOSAT’s archive of historic imagery will complement Space Imaging’s CARTERRA™ digital archive, giving customers the opportunity to perform change analysis for many applications.



SUSAN SINCLAIR, DIRECTOR OF WORLDWIDE DISTRIBUTION NETWORK FOR SPACE IMAGING EOSAT, PRESENTS THE ACRES AWARD TO JIM MOLLISON, ACRES PRODUCT MANAGER.

## ACRES Wins Space Imaging EOSAT Award

ACRES has won yet another worldwide award for being an outstanding regional representative for Space Imaging EOSAT in 1996. The award predominantly recognises the large volume of Landsat data sales by ACRES and our network of distributors. ACRES won a similar award last year for 1995 sales.

The award was presented to ACRES Product Manager, Jim Mollison, at the Space Imaging EOSAT Global Distributors Meeting recently held in Florida, USA.

## New SPOT Distribution Agreement

AUSLIG has concluded a new agreement, with the French company SPOT IMAGE, to continue to acquire and distribute satellite data from the SPOT series of satellites in Australia for a further three years.

The new agreement covers access by both Alice Springs and Hobart receiving stations. The agreement also increases the access time available from the SPOT satellites.

SPOT data products are distributed by SPOT Imaging Services in Sydney who have sub-licenceses in all the Australian Capital cities.

Regular reception of SPOT data by ACRES began at Alice Springs in 1990. The data archive includes approximately 325,000 SPOT scenes from within the station’s zone of visibility which covers Australia, Papua New Guinea and southern Indonesia. The Hobart station, operated by ACRES from 1996, extends the area covered to New Zealand.

## Space Imaging EOSAT 1997 Global Distributors Meeting

*Jim Mollison, ACRES Product Manager*

Space Imaging EOSAT held their annual distributors meeting from 26 – 30 January in Florida. It was the first distributor meeting since the Space Imaging and EOSAT merger in November. This gave distributors from around the world the chance to meet both new and old staff members from Space Imaging EOSAT, and to provide feedback to help influence the new company's operation and direction.

The meeting also provided a forum for Space Imaging EOSAT to inform distributors of the company's future directions, products and policies. Due to the suite of satellite data distributed by Space Imaging EOSAT, they are positioning themselves to be a one-stop-shop for satellite data products. This will be one of their main marketing advantages.

A significant new data source will be from the CARTERRA satellite due for launch in December this year. The satellite was built by Space Imaging and its data will be distributed by Space Imaging EOSAT and their distributors. It will have a 1-metre panchromatic sensor and a 4-metre multispectral (3 visible, one near infra-red) sensor. Some key features of the satellite's data will be its locational accuracy, dynamic range, and simultaneous registration of the panchromatic and multispectral bands.

An update was also given on EarthWatch's EarlyBird satellite due for launch in April/May this year. It will have a 3-metre panchromatic sensor and a 15-metre (3 band) multispectral sensor. All data will be stored in a central archive with on-line ordering available. Distribution rights in Australia are yet to be finalised for EarthWatch data.

One highlight of the meeting, for ACRES, was the presentation of an award for ACRES being an "outstanding regional representative" of Space Imaging EOSAT. (See separate article.)

## SPOT 3 Down, SPOT 1 Up, SPOT 4 Forward

The SPOT 3 satellite experienced a malfunction on 14 November 1996 and all contact has now been lost with this satellite. It appears that the satellite lost control of its position and failed to activate its emergency sun-acquisition mode. This mode normally allows the satellite to keep facing the sun so that the batteries will not run down.

The Alice Springs Ground Station was one of the last sites to track and receive data from SPOT 3. From these last transmissions, the SPOT investigators are hoping to find clues about how and why the problem actually occurred. To help in this investigation, ACRES Alice Springs ground station has made magnetic tape copies of these last acquisitions, and sent them to France.

SPOT 3 was the only SPOT satellite with functioning on-board recorders. Consequently, SPOT 1 has been brought back into service to work along side SPOT 2 so that together they can transmit data directly to the worldwide network of 22 SPOT receiving stations. SPOT 1 has been on standby since 1991, apart from some requirements in 1992, and still provides data of the highest quality.

In addition to the re-activation of SPOT 1, the launch of SPOT 4 will be brought forward to the earliest possible date. This satellite will have the additional features such as an improved lifetime from 3 to 5 years, a new mid-infra-red band for improved crop discrimination, and a new low resolution vegetation instrument.



THE SPACE IMAGING EOSAT DISTRIBUTOR DINNER PROVIDED A GOOD OPPORTUNITY FOR WORLDWIDE DISTRIBUTORS TO MEET SOCIALLY AND CATCH UP ON THE LATEST NEWS.



## RESURS Satellite Data to be Distributed by ACRES

*John Payne, AUSLIG Retail Sales Manager*



BJORN OHLSON, AREA MANAGER FOR SSC SATELLITBILD, AND PAUL TREZISE, ASSISTANT GENERAL MANAGER, AUSLIG, AT THE SIGNING OF THE RESURS AGREEMENT IN CANBERRA.

An agreement was signed on 20 November 1996 between the Australian Surveying & Land Information Group (AUSLIG) and the Swedish Space Corporation subsidiary, Satellitbild, for the distribution through ACRES and sub-distributors of the medium resolution optical Russian RESURS satellite imagery.

Through an agreement with the Moscow-based Sovzond, The Swedish Space Corporation (SSC) is receiving Russian RESURS-O1-3 data at its high latitude Swedish station. Data will be tape-recorded for Australia and other world markets. The data is processed by the subsidiary SSC Satellitbild.

The imagery is acquired by the MSU-SK instrument, a multi-spectral conical scanner, onboard the Russian RESURS-01-3 satellite. Its four spectral bands in the visible and near infra red range with 160m resolution are acquired in passages with a 600 km wide swath, meaning that data over the same region may be acquired often. In Australia the potential revisit interval is about four days.

The wide swath also means that an image covers large areas, drastically reducing the number of scenes needed to produce state-wide or nation-wide coverage. Still, objects the size of individual agricultural fields can be seen in the images.

Due to its repetitivity, its acquisition flexibility and its radiometric quality, AUSLIG believes that popular uses of the data in Australia will include the monitoring of agriculture, coastal zones and environmental changes.

In the near future, SSC Satellitbild will provide ACRES with a local digital archive of imagery products. This will allow sub-distributors to order products which can be delivered immediately. The catalogue will eventually be integrated with the current ACRES

digital Internet-based catalogue for easy browsing by customers. In addition, the catalogue will be regularly updated as more images are supplied by SSC Satellitbild.

It is expected that RESURS data will be distributed in Australia by some of ACRES current distributors.

## IRS and JERS data Available from Space Imaging EOSAT

ACRES would like to remind customers that data from the Indian IRS satellite and the Japanese JERS satellite is available through our agreements with Space Imaging EOSAT (formerly EOSAT). Further details, including prices, are available from ACRES, our distributors, or via the ACRES web page:

[http://www.auslig.gov.au/acres/prod\\_ser/acr\\_ind.htm](http://www.auslig.gov.au/acres/prod_ser/acr_ind.htm)

### IRS

The IRS 1-C satellite was launched in December 1995 and has three sensors on board:

- A 5.8 metre panchromatic sensor which can be steered  $\pm 26$  degrees across track with a swath of 70 km
- A Linear Self-scanning Sensor (LISS) which has three bands in the visible/near infra-red (VNIR) and one band in the short wave infra-red (SWIR). The resolution and swath is 23.5 metres and 142 km respectively for the VNIR bands, and 70.5 metres and 148 km for the SWIR bands.
- A wide field sensor (WiFS) with a coarser resolution of 188 metres and a swath of 774km.

Worldwide data is currently available from ACRES and our distributors through Space Imaging EOSAT in the USA. Countries currently downlinking the data are India, USA, Germany and Taiwan. The use of on-board recorders permits acquisitions over other countries, although India (the satellite's owners and operators) will have preference for using this facility.

Other ground stations are likely to acquire IRS data in the near future. ACRES has recently acquired sample data in Alice Springs and will use this to help us decide on direct acquisition.

### JERS

Both SAR and Optical JERS data is available through Space Imaging EOSAT, for acquisition dates starting in 1992. This data covers many parts of the world, including some areas over Australia taken by the on-board recorder.



## ACRES Customer Service Guarantee – Update

*Mike Pasfield, ACRES Production Manager*

An updated set of Customer Service Guarantees commenced in September 1996. These guarantees include the GCP Products Quote System (see separate article) and an upgraded product dispatch guarantee.

The new guarantees are:

### **HOURS OF SERVICE**

If you ring our customer service number, (06) 201 4107, during ACRES standard working hours, you are guaranteed prompt, personal service. ACRES standard working hours are 0830 to 1700 local Canberra time, Monday to Friday, Canberra public holidays excluded.

### **CATALOGUED DATA**

95% of LANDSAT and SPOT forward acquisitions will be able to be viewed in the ACRES digital catalogue by the close of business on the third working day. All other acquisitions will be able to be viewed in the ACRES digital catalogue by the close of business on the sixth working day.

### **ORDER CONFIRMATION**

If your order involves the generation of products at Levels 4, 5 or 8, we will enter your order into our production system and fax you an order confirmation within four working hours. For orders requiring ground control point marking (levels 9 and 10), we will provide you, within one working day, with a Quote containing the options for generating your product. On acceptance of the Quote, your option will be entered into the system on the date specified in the Quote, and you will receive a Confirmation Order within four working hours.

### **INTERNATIONAL ORDERS**

If you place a completed order with us that requires processing by one of our international partners, we will place your order with them by fax the same day, provided we receive your order before 1600.

### **ORDER DISPATCH**

Refer also to ACRES Freight policy. 95% of products at Levels 4, 5 and 8 are despatched within eight working days. Also, 95% of products at levels 9 and 10 will be despatched by the date specified on the Confirmation Order.

### **OUR QUALITY GUARANTEE**

Refer also ACRES data warranty. If you believe a product is defective, you should advise ACRES and return the product as soon as possible, but definitely within 90 days of the date of dispatch. We will advise

you by fax of our assessment within 48 hours of receiving the returned product from you. If we agree that the product is defective, we will remake your product free of charge and dispatch it to you via courier within 48 hours, or provide a credit note (at your choice).

## ACRES Geocoded Products – New Quotation System

Since September 1996 all customers ordering a product requiring ground control point marking have been receiving a “Quote for Product Requiring Ground Control Point Identification” form from ACRES Customer Services Officers.

This quote is returned to the orderer, giving details of the available map scales and consequent maximum likely error that can be expected from the finished product. An indication of how much lead time will be needed to obtain larger scale maps or other maps not normally held by AUSLIG will also be shown.

The customer will then be able to make some choices by ticking the appropriate boxes and making any relevant comments. This form will need to be returned to ACRES before the order can be queued for processing. The order will be entered into the processing queue on the date indicated under “Order Entry Date” and an Order Confirmation will be returned as per ACRES standard procedures.

This quotation system is designed to give ACRES customers some feedback on their GCP marked products and to enable our Customer Service staff to predict a realistic delivery date.

## Image Writing Tape Labels

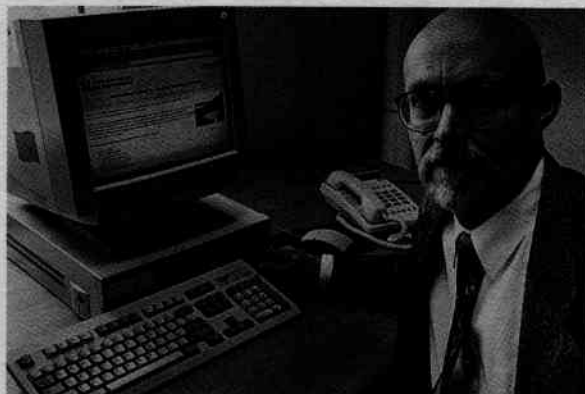
ACRES strives to produce the highest quality products and services, with products from the Image Writing Service being no exception. However, tapes for image writing are sometimes supplied with very limited information recorded on their labels. This can cause difficulties when ACRES personnel are attempting to quality assess them.

To help ACRES give you the best product, could you please ensure that the labels attached to Image Writing Service tapes have at least the following information included:

- Your Company name
- The Image file name
- The file type (BSQ or BIL)
- The number of lines
- The number of pixels (cells)
- Band sequence (RGB or BGR)
- Aperture size to be used for image writing

## Acquisition of Erik Elmar – Future Engineering Projects

*Robert Denize, ACRES Chief Engineer*



ERIK ELMAR HAS RETURNED TO ACRES IN THE ENGINEERING SUPPORT GROUP

Erik Elmar has recently joined the Engineering Support Group at ACRES. Erik comes with a long record of experience in the ground segment of remote sensing programs. You may feel that there is a ring of recognition in the name, and you would be correct. Erik has worked at ACRES previously and during his absence worked overseas installing new ground stations. His new role at ACRES is to manage an engineering project to upgrade and automate the Alice Springs ground station.

When asked how he felt about this project, he replied that he sees it as a challenge, and is enthusiastic about the final outcomes which will see ACRES more efficiently acquiring and cataloguing data.

What does Erik expect to achieve on this project? Even before ACRES started measuring itself with performance goals, it was apparent that the task to consistently acquire data from the many remote sensing satellites now orbiting, and to present a timely on-line catalogue of this data, was stretching the capability of the ACRES equipment and staff.

Thus, an opportunity will be taken to upgrade the Alice Springs ground station to automate much of the actual tracking and acquisition. In addition, the catalogue extraction will eventually be automated also. It is expected that this will allow acquisitions to be taken anywhere around the clock on any day of the year. The data acquired is then planned to be made available on the ACRES catalogue server within twenty four hours of the acquisition.

Now we can see why Erik sees this project as a challenge.

## New Web Site Available for RADARSAT Training

RADARSAT International (RSI) has announced the launch of an innovative World Wide Web site, called RADARSATinACTION.com, to help organisations worldwide adopt the use of RADARSAT data. The site officially opened on 1 February 1997.

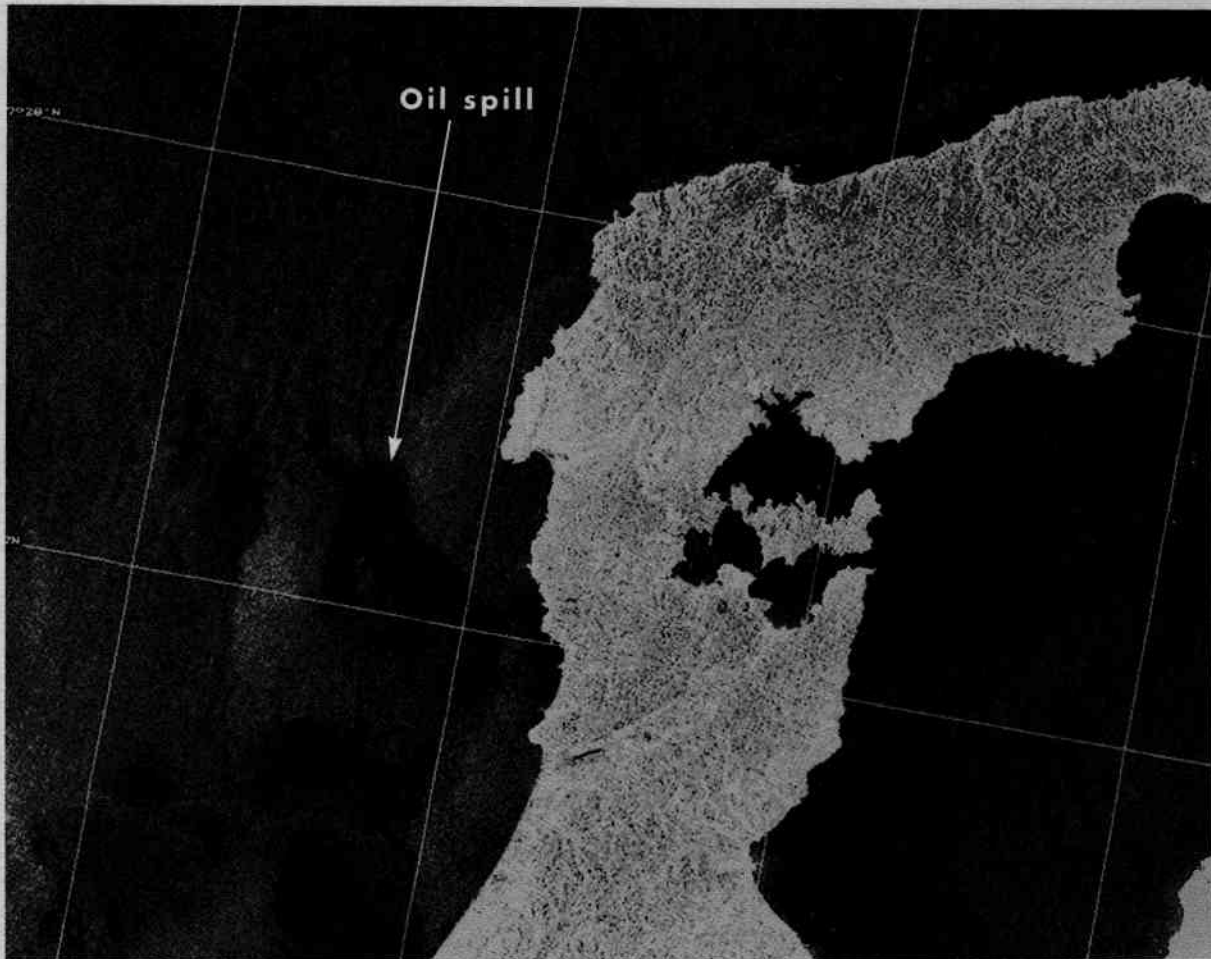
As a unique education and training resource, the Internet site offers visitors:

- information on RADARSAT and its image products
- sample RADARSAT imagery for various applications, configurations and terrain types
- information on basic SAR terminology and interpretation skills
- access to further support, such as value-added services and products, and other training resources
- information on selecting RADARSAT products to meet specific application needs
- an opportunity to communicate with the SAR community
- a calendar of regional events and RADARSAT training courses

This exciting new education tool was built, under the management of RSI, by Geomatics International of Burlington, Ontario, and funded by the Canadian Space Agency through its User Education and Training Initiative (UETI) program. A number of companies from Canada's value-added industry have contributed application and project profiles which highlight real world examples of how RADARSAT data is being used. In addition, RSI expects that industry organisations will play an active role in the continuation and future enhancement of the site.

"For the first time, people will have access to a wide variety of RADARSAT training and support tools on one Internet site. We see RADARSATinACTION.com as a mechanism for educators and trainers to communicate with each other and exchange ideas on introducing the use of RADARSAT into organisations around the world", said Wendy Branson, RSI's Manager of Education.





THE OIL SPILL CAN BE SEEN AS THE DARKEST AREA TO THE LEFT OF THE LARGE AND LIGHTLY SHADED NOTO PENINSULA. RADARSAT DATA COPYRIGHT CANADIAN SPACE AGENCY/ AGENCE SPATIALE CANADIENNE 1997. RECEIVED BY THE CANADA CENTRE FOR REMOTE SENSING. PROCESSED AND DISTRIBUTED BY RADARSAT INTERNATIONAL.

## RADARSAT Captures Oil Spill in Japan

On 11 January 1997 one of the worst oil spills in Japanese history was captured by RADARSAT International (RSI) and delivered electronically within five hours to the Remote Sensing Technology Centre of Japan (RESTEC).

The spill occurred several days earlier from an ageing Russian tanker which broke up and sank in stormy weather in the sea of Japan. Initial fears were held about the 15 nuclear reactors along the nearby coast which rely on sea water to help with their cooling operations. The area is also one of Japan's fertile fishing areas with many small ports and tourist resorts.

As RSI's distributor of RADARSAT data in Japan, RESTEC was able to quickly provide the data to local agencies involved in assessing the spill. The delivery of data within five hours of acquisition demonstrates the disaster response, programming and delivery capabilities of RSI and the RADARSAT program. The image was acquired using RADARSAT's unique Standard beam position 5 which has a viewing angle of 36 to 42 degrees.

## New Version of "Australia from Space" CD-ROM

*Resource Industry Associates, Melbourne*

ACRES distributor, RIA, has recently released a new version of the popular CD-ROM Australia from Space.

The CD now includes a full copy of TerraScan Professional software for use with the raw satellite data on the disk.

RIA director, Jeff Bailey, indicated that most Australian universities offering remote sensing courses have included the Australia from Space CD-ROM in their curriculum. Now with the inclusion of TerraScan Pro, the package becomes a very powerful training tool for remote sensing. The product will be of particular interest to MapInfo and ArcView users as TerraScan now is able to warp images and output the processed images in MapInfo and ArcView formats.

Bailey advised that RIA expects to release in the near future a complementary training package for use by schools.

Further information is available from:

<http://www.ria.com.au>

## Update from the West

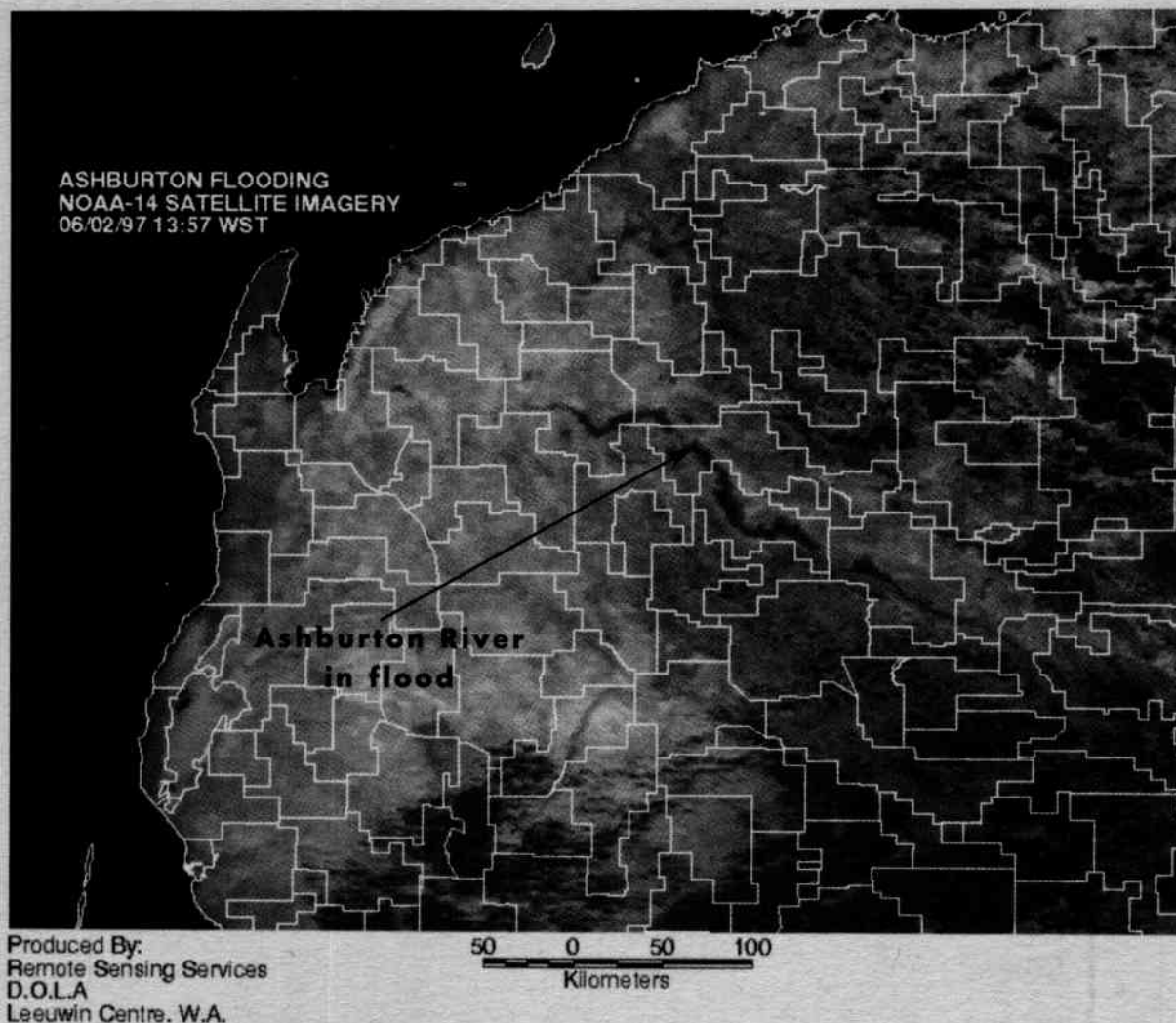
*Remote Sensing Services, Department of Land Administration, WA*

NOAA-AVHRR was actively used in early February to track the extent of flooding of the Ashburton River south of the Pilbara for the State Emergency Services. The flooded area extended for over 200 km along the river and spread out to widths of up to 30 km. The daily overpasses of NOAA-AVHRR make it ideal for these emergency situations where near real-time information is needed. RSS hope to follow up with a more detailed Landsat TM image if a cloud free overpass is available.

NOAA-AVHRR data is also used on a daily basis for near real-time fire detection, fire history mapping, vegetation greenness monitoring and wheat yield forecasts.

A seamless mosaic of eight Landsat-TM scenes with all six bands covering the North Pilbara is now available on CD-ROM. This seamless mosaic involves the precision registration and cross radiometric calibration of all scenes. A similar mosaic of the South Pilbara region will be available at the end of March. The objective of these mosaics is to make Landsat-TM data held in the RSS DOLA archive more accessible to end users.

The SPOT-Pan/Landsat-TM mosaic of south western Australia was released at the end of February. The accuracy of this mosaic has been enhanced by registering the ACRES SPOT-Pan/Landsat-TM level 10 data to independent digital road centre line data to achieve the additional accuracy required by GIS users in State Agencies.



NOAA-14 IMAGE ACQUIRED ON 6 FEBRUARY 1997 SHOWING THE ASHBURTON RIVER IN FLOOD RUNNING FROM THE SOUTH-EAST OF THE IMAGE TO THE NORTH-WEST.



# Measuring Leaf Area Index by Remote Sensing

Tim McVicar, CSIRO Land and Water

Leaf Area Index (LAI) is a measure of vegetation cover and is important in understanding crop yield and water balance, and as an indicator of catchment health. LAI is defined as the leaf area (in m<sup>2</sup>) over 1 square metre of ground, and so is dimensionless.

A joint project to assess and map salinity hazard in the Loddon-Campaspe area of northern Victoria recently required regional estimates of LAI over some 20,000 km<sup>2</sup>. The project was carried out by CSIRO Land and Water (formerly Division of Water Resources, Division of Soils, and Centre for Environmental Mechanics), CSIRO Earth Observation Centre, and the Centre for Land Protection Research, Bendigo, Victorian Department of Natural Resources and Environment.

Modellers looking at how plants respond to soil moisture required regional estimates of LAI to predict the amount of water passing shallow-rooted crops and entering aquifer systems. This water can discharge from the landscape as stream flow, or to the surface to produce waterlogging and dryland salinisation.

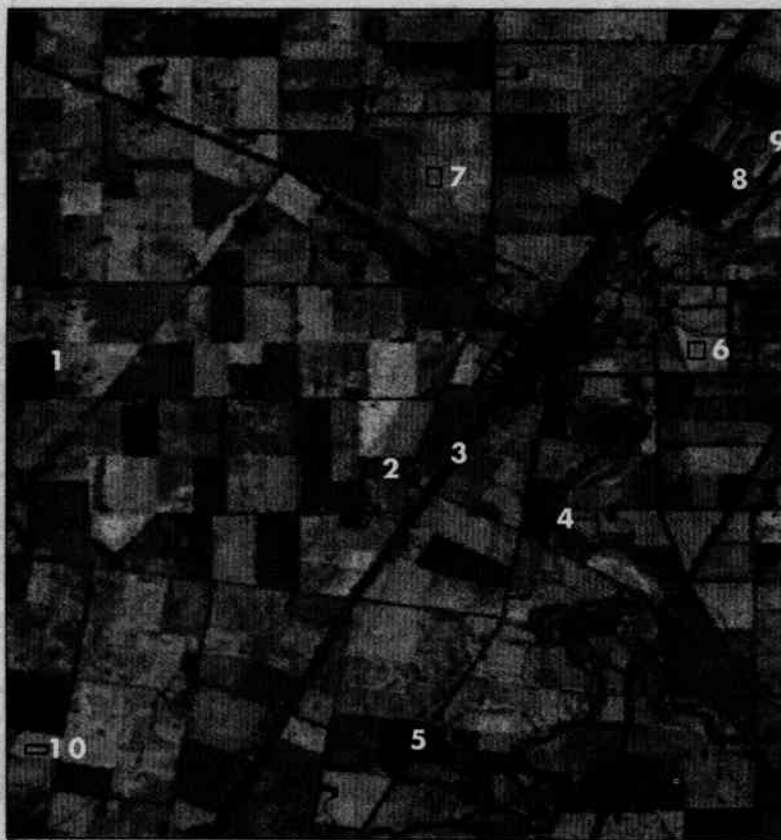
To estimate LAI over such a large area, field measurements were linked to remote sensing. CSIRO's Tim McVicar and his colleagues have developed relationships between the *in situ* LAI measurements, taken by destructive sampling of 1m<sup>2</sup> of grassland, with a planetary-corrected albedo LANDSAT TM NIR / Red ratio

for four dates in 1995. These dates were in the growing season when suitable cloud-free imagery was available. Field measurements were done within a fortnight of the TM data being acquired. These relationships were then used to scale the TM ratio to provide estimates of LAI for the entire scene.

Since cropping and pasture LAI changes quickly, a long time series of remotely sensed estimates of LAI were required. Due to project constraints it was decided to use an existing 8-year time series of monthly data from NOAA's Advanced Very High Radiometric Resolution (AVHRR) sensor. The planetary-corrected albedo LANDSAT TM simple ratio estimate of LAI was then related to AVHRR data, which has a 1km<sup>2</sup> spatial resolution. In this way 1m<sup>2</sup> measurements of LAI were scaled to 1 km<sup>2</sup> estimates by using TM data as the intermediate for the same four dates in 1995. These relationships were then applied to the 8-year time series of AVHRR data.

Regional estimates of LAI were developed for three different GIS strata: landcover (crop, pasture and forest), soils, and long term average rainfall. Between AVHRR acquisitions, splines were fitted to these data so that LAI could be estimated for any day within the 8-year period based on actual observations. These data were used by the plant growth modellers to validate the time series of LAI that were imposed onto the plant-soil model to estimate regional recharge into the aquifers.

This work has been written up in four recent publications. If you would like copies please send e-mails to [trm@cbr.dwr.csiro.au](mailto:trm@cbr.dwr.csiro.au).



TM LAI Estimates				
	FEB	AUG	OCT	NOV
1	0.33	0.36	0.60	0.68
2	0.28	0.63	2.00	0.69
3	0.32	1.58	0.66	1.64
4	1.15	0.37	0.32	0.32
5	0.28	0.66	0.31	0.30
6	1.25	1.38	2.04	1.24
7	0.28	1.36	1.93	0.64
8	0.30	1.91	0.44	0.30
9	1.45	1.51	0.85	0.38
10	0.44	1.53	2.70	0.78

THE VALUES SHOWN ARE THE MEAN TM LAI ESTIMATES CORRESPONDING TO THE NUMBERED PATCHES ON THE IMAGE FOR THE FOUR DATES ACQUIRED IN 1995. THE IMAGE IS A B&W VERSION OF TM LAI ESTIMATES FOR FEBRUARY, AUGUST AND OCTOBER DISPLAYED THROUGH THE BLUE, GREEN AND RED COLOUR GUNS, RESPECTIVELY. THE IMAGE IS CENTRED ON THE TOWNSHIP OF ELMORE, 45KM NW OF BENDIGO. THERE IS BOTH IRRIGATED AND DRYLAND FARMING IN THE IMAGE. TO VIEW THE SAME IMAGE IN COLOUR, POINT YOUR WWW BROWSER TO: [HTTP://WWW.DWR.CSIRO.AU/CATCHMENT/REMOTE/REMOTE.HTML](http://www.dwr.csiro.au/catchment/remote/remote.html)

# Satellite Imagery and the AUSLIG Public Interest Mapping Program

*Craig Smith, ACRES Applications Specialist*

## BACKGROUND

In 1991 AUSLIG commenced a major program of digital conversion of its topographic map products. As part of the digital conversion process the map information was enhanced to facilitate its use in a GIS. The enhanced data are known as GEODATA.

The GEODATA product derived from the national coverage of 1:250,000 scale topographic maps is known as TOPO-250K. A similar product, TOPO-100K, is also being produced from the coverage of 1:100,000 scale topographic maps. TOPO-250K is a vector representation of the major topographic features that appear on those maps. The topographic features of the real world are represented by points, lines and polygons and the characteristics of the features are described by attributes. Australia is covered by about 540 TOPO-250K tiles (mapsheet areas). The data are also grouped into themes or coverages. These coverages represent roads, railways, streams, built-up areas, waterbodies, offshore features, framework, aeronautical features, localities, vegetation, and spot heights.

TOPO-250K data are subject to an ongoing revision program. This program ensures that the TOPO-250K information content remains current and is correct. The program will update more than one hundred tiles per year. The emphasis of the revision program will be in the areas where cultural feature change is most rapid. Roads, and built-up areas are the features most subject to change.

The revision program utilises a number of data sources. These include SPOT Pan & Landsat TM satellite imagery, and change & error reports from map and GEODATA users. A range of organisations that regularly use spatially related information also provide intelligence information to AUSLIG.

The frequency of revision of a GEODATA tile is determined by the amount of change and the number of detected errors in the tile. If there is significant and continual change in an area then the tile may be revised as often as once every twelve months. The maximum period between revisions is ten years.

## USE OF SATELLITE IMAGERY

The enhanced satellite imagery used in the revision of maps and GEODATA is derived from standard precision geocoded products produced by ACRES.

The geocoded imagery is edge enhanced and contrast stretched before transfer to the ARC/INFO system environment. Approximately two Landsat TM images and four SPOT Panchromatic images are required for total coverage of a TOPO-250K tile.

Topographic information is obtained by visual assessment of the satellite imagery as displayed on a computer monitor. During editing, the SPOT and TM images are displayed on the screen as a backdrop to the TOPO-250K data. New features are added to the data and the location of existing features are checked against their position in the imagery. Intelligence information from sources such as the Australian Automobile Association and the Australian Geological Survey Organisation are used to verify the attributes of features. As a separate operation digital classification of the imagery is undertaken to produce the vegetation theme. Features identified on the imagery can be mapped with a positional accuracy of about 30 metres using SPOT Panchromatic and 60 metres using the Landsat TM. This is well within TOPO-250K accuracy specifications.

Dams, reservoirs, large streams, built-up areas, major roads in open terrain, and railways are easily seen on the remotely sensed images. Small streams and minor roads in forested terrain are difficult to see on the imagery. It can be difficult to discriminate between roads and railways, with additional information being required to make the discrimination. Small streams can sometimes be identified by the greener or distinctive vegetation associated with them. It is easier to identify watercourses and waterbodies on the Landsat TM images than the SPOT Pan imagery. The seasonal conditions at the time of image acquisition is a factor in the successful identification of minor watercourses. The SPOT imagery is suitable for identifying the majority of cultural features including minor roads.

Point features such as buildings or bores cannot be confidently identified on either TM or SPOT images. This is not a significant problem for the revision of TOPO-250K, since the point feature types contained in TOPO-250K, spot heights, localities, and airfields, are not susceptible to positional change.

Alternatives to the use of satellite imagery for the revision of TOPO-250K are the use of field survey parties and aerial photography. Both these alternative survey methods offer greater certainty in feature identification and greater positional precision. The data output from both methods is equally up-to-date as that from satellite imagery. However, the data are less easily loaded into a digital environment, and are much more costly to collect. Satellite imagery has the additional advantage that it will soon be available in finer spatial resolutions.

The 6 metre resolution Panchromatic imagery from the IRS 1C satellite looks to be a promising new data source although we have not yet fully appraised the imagery. The 5m Pan data to be offered by SPOT 5 may prove to be a good compromise between cost and resolution for the most common scales of AUSLIG topographic mapping. The commercial availability of 1 - 3 metre resolution panchromatic imagery in the



coming years is viewed with some anticipation at AUSLIG. Regardless of the quality of any future satellite imagery there will always be a need to incorporate a complementary range of data sources in the production of AUSLIG's mapping and GIS products.

## Geoimage – SPOT Imaging Services Pilot Projects

*Bernie Fitzpatrick, Geoimage, Darwin*

Geoimage Pty Ltd and SPOT Imaging Services Pty Ltd have jointly sponsored two Pilot Projects which are developing operational uses of SPOT image data.

The Pilot Projects are being undertaken in co-operation with the Northern Territory Department of Primary Industry and Fisheries, and representation from the relevant Primary Industry sector.

### **RANGELAND WEED ASSESSMENT: MONITORING MIMOSA PIGRA INFESTATIONS**

This project will assess the use of SPOT XS imagery for identifying and monitoring the extent and health of *Mimosa pigra* infestations. In addition the detection of biological control agents will be assessed. The desired outcome is a method for monitoring the effectiveness of mechanical, chemical and biological control programs.

### **HORTICULTURAL MONITORING: MANGO ORCHARD DETECTION AND MONITORING**

The second project will determine the capability of SPOT XS imagery to detect and measure the size of mango orchards. The capability of multi-temporal imagery to provide information on the age of mango orchards will also be assessed. From this work it is hoped to determine production estimates

SPOT Imaging Services have sponsored the supply of data and Geoimage are providing technical and image processing support for both projects.

The projects are integrating remote sensing and geographic information systems techniques to address spatial information requirements which will improve decision making.

Initial results of analysis of the SPOT data have been encouraging and further work is currently being undertaken on the GIS integration. It is anticipated that the Pilot Projects will be completed by the middle of 1997.

For further details please contact:

Bernie Fitzpatrick  
Geoimage Pty Ltd  
GPO Box 3499  
Darwin NT 0801  
Tel: 08 8941 3677  
Fax: 08 8941 3670

## Geoimage Expands

Geoimage Pty Ltd, one of ACRES largest distributors, is opening up a new office in Perth, and has taken on a new staff member in their Darwin office.

Max Bye from the Brisbane office has now relocated to Perth to open Geoimage's third office. Max will be providing the same services and products as currently available from Brisbane and Darwin. Contact details are on the back page of 'ACRES Update'.

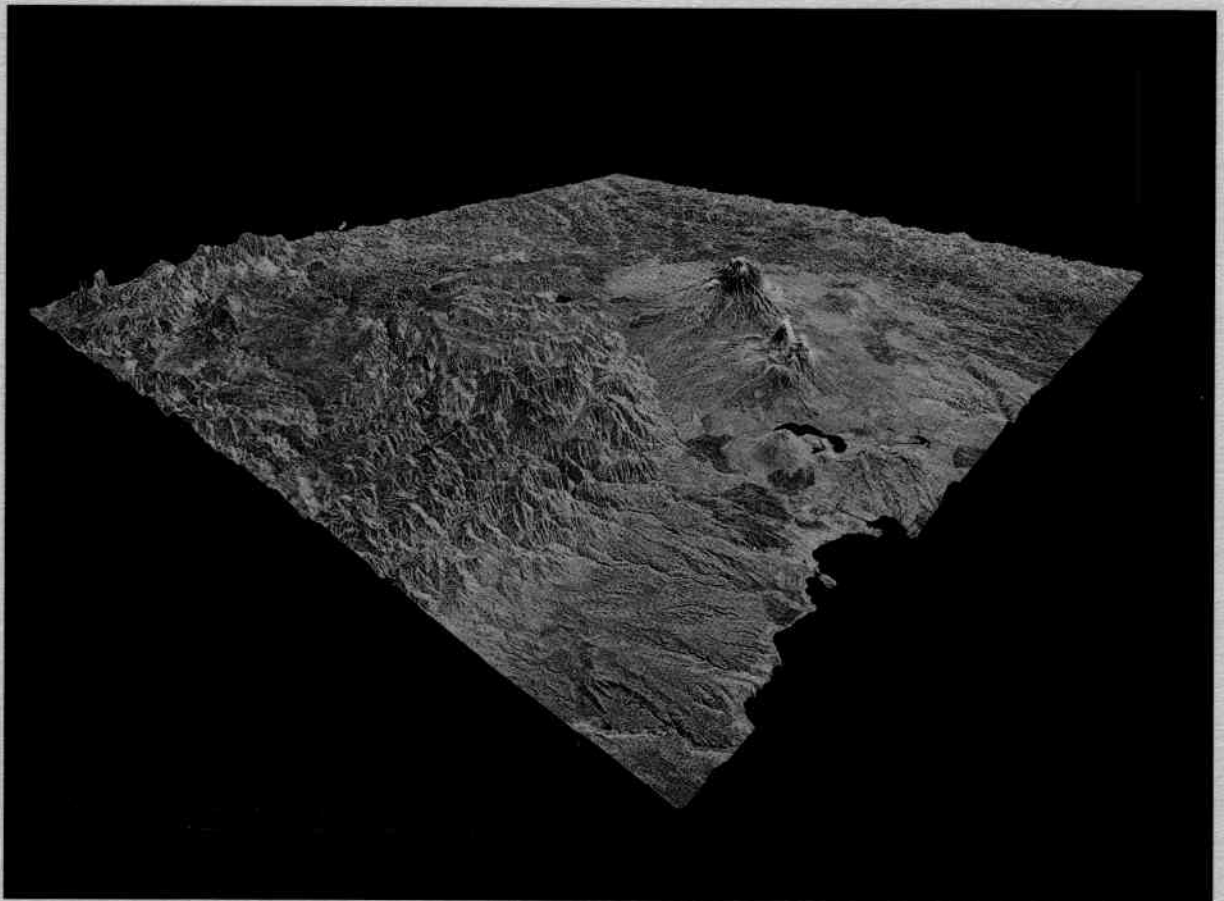
Paul Ryan has joined Geoimage in their Darwin Office. Paul has experience in both remote sensing and geographic information systems in tropical Australia and will strengthen Geoimage's natural resource management and land management capabilities.

## Additional staff for SPOT Imaging Services

Damian Carroll has recently moved from Canberra to Sydney to join the staff of SPOT Imaging Services Pty Ltd. Damian was previously with AUSLIG for nine years where he was responsible for product development of AUSLIG's GIS products. He therefore brings to SIS a wealth of experience in the development and marketing of products for the GIS market. He will now apply these skills to help grow the market for imagery and products from the SPOT satellite constellation. Damian has post graduate qualifications in the field of Remote Sensing and is looking forward to working in the area again.



DAMIAN CARROLL HAS RECENTLY JOINED THE TEAM AT SPOT IMAGING SERVICES, SYDNEY.



RADARSAT IMAGE TAKEN ON 20TH OCTOBER 1996 ON AN ASCENDING PASS USING S4 BEAM MODE. SCENE CENTRE IS 39.4 DEGREES S AND 175 DEGREES E, WITH A CENTRE INCIDENCE ANGLE OF 37 DEGREES. (RADARSAT DATA COPYRIGHT CANADIAN SPACE AGENCY/ AGENCE SPATIALE CANADIENNE 1996. RECEIVED BY THE CANADA CENTRE FOR REMOTE SENSING. PROCESSED AND DISTRIBUTED BY RADARSAT INTERNATIONAL.)

## RADARSAT over New Zealand

*Stella Belliss, Manaaki Whenua-Landcare Research, NZ*

The accompanying image is the first RADARSAT image taken of New Zealand. It was provided to Landcare Research (NZ), an ACRES RADARSAT Distributor, courtesy of the Canadian Space Agency and RADARSAT International. It will be used to help promote RADARSAT data to the New Zealand marketplace.

Manaaki Whenua-Landcare Research is one of the nine New Zealand Crown Research Institutes. With a core business devoted to sustainable land use management, the company undertakes fundamental research for the New Zealand Government under contracts awarded from a contestable pool of finite financial resources. Landcare Research also undertakes other contract work, both research and applications oriented, for a variety of clients in New Zealand and overseas.

This 3-D view of the RADARSAT scene is taken looking slightly west of south, along three active

volcanos in the central North Island. Features in the image include:

- In the right foreground, the southern edge of Lake Taupo can be seen. It was formed during a massive eruption in about 120 AD.
- To the left and background right of Lake Taupo, farmland and cold dry desert country of the Volcanic Plateau is present. The smooth texture is due to the preponderance of Taupo pumice alluvium as a substrate.
- Between Lake Taupo and the mountains, the darker coloured areas are *Pinus radiata* stands. These forests are to be mapped and monitored as part of a major investigation of carbon sequestration, using NASA/JPL AirSAR data (taken 5 November 1996).
- Following along the line of volcanoes, the quiescent Pihanga (1375m) is just in front of Lake Rotoaira. This is followed by Tongariro (1961m), the very conical Ngauruhoe (2287m) and, behind that, Mt Ruapehu (2797m).



- In the far distance behind the mountains is the steep hill country north and east of Wanganui, the nearest city. Primarily tertiary mudstones, siltstones, and sandstones, the area is very prone to landslides, especially where the native bush was removed for pasture land. This area forms part of what Landcare Research will be using to research the use of RADARSAT SAR for landslide mapping and monitoring. Data specifically for this (ADRO) project was taken earlier this year.
- To the left of the perspective view, the steep Kaimanawa Ranges can be seen. They were formed primarily from Mesozoic greywackes, with some tertiary outliers of sandstones, mudstones and limestones. The left corner of this perspective area forms part of the very first space SAR study in New Zealand, using SIR-B data from 1984.

The Image Processing Group within Landcare Research has been working in remote sensing since the mid-1970's with Landsat 2. Landcare Research are agents for many of the remote sensing satellite services around the world, including JERS, EOSAT, SPOT, and RADARSAT. The group also runs its own receiver for NOAA AVHRR data, archiving the two highest passes each day.

For more information about RADARSAT, Landcare Research, or the image processing and remote sensing services provided, please contact:

Landcare Research  
 Box 38 491  
 Wellington Mail Centre  
 New Zealand  
 Tel: +64 4 569 0180  
 Fax: +64 4 569 0181

BellissS@Landcare.cri.nz

McNeillS@Landcare.cri.nz

PairmanD@Landcare.cri.nz

## ACRES Digital Catalogue – Finalist in the Australian Information Industry Association National Awards for Excellence

*Donna Scott, ACRES Business Manager*

The ACRES Digital Catalogue was one of eight finalists chosen for the 1996 National Awards for Excellence through Information Technology. The award recognises organisations using information technology in the most innovative, cost effective and productive way to achieve their business objectives.

The Awards are presented in three categories to recognise small, medium and large organisations. The Digital Catalogue was one of three finalist in the small organisations category.

Some of the selection criteria used by the judging panel to examine the nominations were: the innovativeness of the application; value for money; achievement of the business or organisations' objectives; the success of the IT solution in meeting customer requirements; whether savings or increased profits are achieved; the implementation process and whether the new technology solution will help generate new business.

As commented by Michael Hedley, Manager Corporate Relations of the AIIA; "the quality of nominations received certainly show Australian public and private organisations successfully using information technology to achieve excellent management and strategic outcomes."

## NARGIS 97

The Northern Australian Remote Sensing & Geographic Information Systems Forum will be held at the Cairns Campus of James Cook University from 27-30 April 1997. The conference theme will be "Northern Focus".

Papers being presented have been arranged into three main themes of Environmental Management, Land & Resource Management, and Urban & Regional Planning. A social program and accompanying persons tour has also been arranged.

On Thursday 1 May there will also be a public workshop to explore issues that are central to the development of the Australian Spatial Data Infrastructure (ASDI).

For further information on NARGIS, please contact:

Cairns Conferences  
PO Box 1082,  
Cairns Qld 4870  
Tel: (070) 313 747  
Fax: (070) 312 940

For further information on the ASDI workshop, please contact:

Ken Granger  
Tel: (07) 3864 8097  
Fax: (07) 3864 8758  
E-mail: kgranger.agso@bom.gov.au

## AURISA 1996 Conference

*John Lee, ACRES Account Manager*

Another successful AURISA conference was held at the Wrest Point Hotel Casino in Hobart from the 25th to the 29th November 1996.

This conference gave AUSLIG the chance to show the industry that AUSLIG is still very active in the information industry by our continued roles in National Programs such as Policy and Coordination, Geodesy, Remote Sensing, Maritime Boundaries and National Mapping.

AUSLIG also had a trade booth where we showed off our products and services including a demonstration of the ACRES Digital Catalogue System, where any scene in ACRES digital archive can be viewed by anybody that has access to the Internet. Access to the ACRES Digital Catalogue system is via the AUSLIG home page, <http://www.auslig.gov.au/acres/index.htm>

The ACRES Digital Catalogue created a great deal of interest at the conference and many thanks must go to ACRES Tasmanian Distributor, Mr Ross Lincolne from Space Images who supplied the PC, modem and expertise in demonstrating the system.

## TerraScan Shareware on Internet

As a special effort to assist the rural community in applying mapping technology to land management, the developers of TerraScan image mapping software have provided a SHAREWARE release on the Internet.

Australian farmers interested in applying or assessing the benefits of imagery, including GPS (Global Positioning System) technology, to their farm management decisions, can now access state of the art software for mapping on their aerial photo or satellite image.

Melbourne based Resource Industry Associates (RIA) has over 10 years of experience in processing imagery and GPS technology, and has developed the TerraScan software, which is used extensively by the mining and environmental industries, geological survey organisations and government agencies like the Murray Darling Basin Commission.

Farmers and other interested organisations are able to access and download TerraScan Lite software for free as a Shareware program from RIA's Internet Web Page. This is sufficient for most prospective users to understand and gain an appreciation of the value of the software. In order to access the TerraScan program to print data, users need to become a registered user which costs just \$100.

Alternatively, another customer service offered by RIA is the conversion of farm survey data or an aerial photo direct onto a compact disk, complete with a registered copy of the TerraScan ProGPS software, on one CD which costs \$250.

RIA's Jeff Bailey said that individual farmers, farm management consultants and government agencies involved with agriculture and resource management are all recognising the benefits which GPS survey technology can contribute to management, planning and allocation of resources in agriculture. "The tools to utilise this data like our TerraScan ProGPS software are now becoming readily accessible".

Access to the TerraScan software and further information can be obtained at RIA's Web Page at:

<http://www.ria.com.au>

or they can be contacted direct:

Resource Industry Associates  
538 Brunswick Street,  
North Fitzroy Victoria, 3068  
Tel: (03) 9482 4945  
Fax: (03) 9482 4956



## Calendar

24–27 March 1997

Paris, France

### *2nd International Symposium: The Expansion of the Remote Sensing Market*

Contact: AAAF – Céline Douchez, 6, rue Galilée,  
75782 Paris, Cedex 16, France.

Tel: 33 (1) 47 23 58 11.

Fax: 33 (1) 47 23 89 11.

28–30 April 1997

Cairns, Australia

### *Northern Australian Remote Sensing & Geographic Information Systems Conference (NARGIS 97). Cairns Campus of James Cook University, Captain Cook Highway, Smithfield, Cairns.*

Contact: NARGIS 97, PO Box 1082, Cairns Qld  
4870.

Tel: (070) 313 083.

Fax: (070) 312 940.

E-mail: cairnsman@internetnorth.com.au.

25–30 May 1997

Ottawa, Canada

### *Geomatics in the Era of RADARSAT*

This joint conference will encompass all aspects of geomatics including GIS, GPS and remote sensing, from fundamental research to commercial applications.

Contact: Rose Barth, Conference Manager, 588  
Booth, Room 333, Ottawa, Ontario,  
K1A 0Y7

Tel: (613) 947 7059

Fax: (613) 996 2817

E-mail: ger97@ccrs.nrcan.gc.ca  
<http://www.ccrs.nrcan.gc.ca/ger97/>

1–9 July 1997

Melbourne, Australia

### *Joint Assemblies of International Association for Meteorology & Atmospheric Sciences, and International Association for Physical Sciences of the Ocean.*

7–10 July 1997

Copenhagen, Denmark

### *Third International Airborne Remote Sensing Conference and Exhibition: Development, Integration, Applications & Operations*

Contact: ERIM/Airborne Conference, PO Box  
134001, Ann Arbor, MI 48113-4001, USA.

Tel: (1) 313 994 1200, ext. 3234.

Fax: (1) 313 994 5123.

E-mail: wallman@erim.org.  
<http://www.erim.org/CONF/conf.html>.

13–18 July 1997

Hobart, Australia

### *Antarctica and Global Change: Interactions and Impacts Symposium*

<http://www.antcrc.utas.edu.au/antcrc/events/antsymp.html>.

Contact: Mures Convention Management.

Tel: +61 03 6234 1424.

Fax: +61 03 6234 4464.

E-mail: mures@hba.trumpet.com.au.

3–8 August 1997

San Diego, California, USA

### *International Symposium on Spectral Sensing Research: Observation to Information*

Contact: Camber Corporation, 601 13th Street NW,  
Suite 350N, Washington, DC 20005, USA.

Tel: (202) 393-1648.

Fax: (202) 628-8498. E-mail: register@issr.org.

Internet: [www.issr.org](http://www.issr.org).

4–8 August 1997

Singapore

### *1997 International Geoscience and Remote Sensing Symposium: Remote Sensing – A Scientific Vision for Sustainable Development, International Convention and Exhibition Centre, Singapore*

Contact: Tammy Stein.

Tel: 281 291 9222.

Fax: 281 291 9224.

E-mail: tstein@phoenix.net.

17–19 November 1997

Denver, Colorado, USA

### *Twelfth International Conference and Workshops: Applied Geologic Remote Sensing – Practical Solutions for Real-World Problems*

Contact: ERIM/Geologic Conference, PO Box  
134001, Ann Arbor, MI 48113-4001, USA.

Tel: 1-313-994-1200, ext. 3234.

Fax: 1-313-994-5123.

Inquiries: wallman@erim.org.

1–3 June 1999

Warsaw, Poland

### *Remote Sensing and Forest Monitoring Conference*

Contact: Tomasz Zawila-Niedzwiecki and Heronim  
Olenderek, SGGW, Warsaw Agricultural University,  
Faculty of Forestry, 26/30 Rakowiecka str., 02-528,  
Warsaw, Poland.

Fax: 48-22-491 375.

E-mail: tzawila@giswitch.sggw.waw.pl.

## ACRES official distributors

## NEW SOUTH WALES

## Land Information Centre (LIC)

Department of Land and Water Conservation  
Panorama Avenue  
PO Box 143  
Bathurst NSW 2795  
Tel: (063) 32 8419  
Fax: (063) 31 8095

## SPOT Imaging Services Pty Ltd (SIS)

Suite 502  
156 Pacific Highway  
PO Box 197  
St Leonards NSW 2065  
Tel: (02) 9906 1733  
Fax: (02) 9906 5109

## ENCOM Technology Pty Limited

Level 2, 118 Alfred Street  
PO Box 422  
Milson's Point NSW 2061  
Tel: (02) 9957 4117  
Fax: (02) 9922 6141

## VICTORIA

## Resource Industry Associates (RIA)

538 Brunswick Street  
North Fitzroy Vic 3068  
Tel: (03) 9482 4945  
Fax: (03) 9482 4956

## AUSTRALIAN CAPITAL TERRITORY

## AGRECON Pty Ltd

University of Canberra  
PO Box 1  
Belconnen ACT 2616  
Tel: (06) 201 2565 (BH)  
Fax: (06) 201 5353 (BH)  
Tel/Fax: (06) 227 5021 (AH)  
Mobile: 015 26 4623

## Environmental Research &amp; Information Consortium Pty Ltd (ERIC)

National Surveyors House  
27-29 Napier Close  
Deakin ACT 2600  
PO Box 179  
Deakin West ACT 2600  
Tel: 257 2781  
Fax: 257 2912

## QUEENSLAND

## Department of

## Natural Resources

Remote Sensing Unit  
Cnr Main and Vulture Streets  
Woolloongabba QLD 4102  
Locked Bag 40  
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