



acres news

Australian Centre for Remote Sensing

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DISTRIBUTION AGREEMENT SIGNED WITH SPOT IMAGING SERVICES

During the Perth Remote Sensing Conference ACRES completed negotiations and signed the first Distribution Agreement for SPOT Data received through the Australian receiving station. The agreement signed by Carl McMaster for ACRES and Gerard Brachet, a Director of SPOT Imaging Services (SIS), provides for SIS to be the first licensed distributor of ACRES SPOT data. SIS has been established for some time under the leadership of Jean Luc de Fanti selling data acquired through the SPOT facilities at Toulouse and Kiruna. SIS now also has full access to the Australian data received directly at Alice Springs and ACRES looks forward to working closely with SIS to service the needs of SPOT customers in Australia.



Pictured at the signing (L to R) Dennis Puniard (ACRES), Keiko Crowley (SIS), Jenny Weissel (ACRES), Jean Luc de Fanti (SIS), Gerard Brachet (SPOT Image) and Carl McMaster (ACRES).

LANDSAT 6 LAUNCH DELAYED

EOSAT has advised that the proposed date for launch of LANDSAT 6 has been rescheduled for 18 May 1992. The change in launch date is due to the unavailability of the high-reliability electronic components required for the five-year on-orbit operating life of LANDSAT 6.

LANDSAT 6 will carry an enhanced Thematic Mapper (ETM) sensor which will have the same multispectral imaging capabilities as LANDSAT 4 AND 5 and in addition, will have a panchromatic mode capable of discerning objects as small as 15 metres. LANDSAT 6 will orbit the earth at the same altitude, inclination and equatorial crossing time as LANDSAT 4 and 5.

The operational life of LANDSAT 4 and 5 has been marked with failure of components on board both satellites but these failures have not resulted in failures of the missions. LANDSAT 4 and 5 continue to operate nominally.

Although LANDSAT 4 MSS data is available to international ground stations via the S-band transmission link, the data is marred by the presence of coherent noise. Unfortunately, a total failure of the X-band link on LANDSAT 4 has resulted in the non-availability of TM data to international ground stations. However, TM data from LANDSAT 4 is available from ACRES via an ACRES/EOSAT agreement.



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MANAGERS MESSAGE



Carl McMaster, Manager ACRES

The nature of our business is such, that we need to devote much of our time and resources to planning — new satellites, products, processing systems etc. At the same time we need to ensure timely delivery of the required data products to our clients at affordable prices.

We believe ACRES is in good shape to do both.

We have a committed staff working for a contractor who is determined to succeed in containing costs while increasing services and sales. The data acquisition and processing systems at ACRES normally cope with the workload without undue delays.

Plans are in place to ensure that Australia benefits by access to data from SPOT-2 (Jan '91), ERS-1 (April '91) and LANDSAT-6 (May '92) and we have opened discussions with NASDA for access to the Japanese satellite MOS-2 ('92).

None of this activity is happening by accident but is the result of both individual effort within ACRES and cooperative support from organisations like the Australian Space Office and CSIRO Office of Space Science and Applications (COSSA) and the members of ALCORSS.

As this is the Christmas issue of ACRES News, may I also take this opportunity, on behalf of ACRES Management and staff, to wish all Distributors, Reference Centres and Clients a Merry Christmas and a happy and prosperous New Year.

FROM THE DIRECTORS DESK

As another year comes to a close and we all prepare for a well earned break, it is useful to reflect on the busy year in operations at ACRES and to look forward to another exciting year ahead. With SPOT reception now a fact, Computer Sciences Australia firmly established as our contractor, several long serving staff having moved on and new staff joining our team, 1990 has been an eventful year. However as we gear up for ERS-1, Landsat 6 and a whole generation of new satellites 1991 promises to be even more exciting. All ACRES staff look forward to the challenge to provide even better service to our established and new clients in 1991.

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ACRES is part of the Australian Surveying and Land Information Group (AUSLIG) within the Department of Administrative Services

DAS Service
is Our
Business

ACRES at AURISA 90 Conference

The AURISA 90 Conference, held in Canberra from 21st to 23rd November, saw a high profile for ACRES. A technical display demonstrating the SPANS GIS and other ACRES products for GIS/LIS applications were features of the technical exhibition. A paper on "Geocoded Image Products for Integration into GIS" was

presented by Dennis Puniard, Director Operations (jointly authored by Paul Wise and John Horn) and as Dennis was the Conference Chairman ACRES received honorable mentions throughout the Conference which was attended by over 400 delegates.



ACRES Display Stand — AURISA Conference

MARKETING AND SALES

The Marketing and Sales team are looking forward to 1991 as a year, not only of consolidating and improving our existing LANDSAT data supply and image writing business but of building up the market for ACRES SPOT data.

ACRES Distributor and Reference Centre Meeting

Prior to the start of the 5th Remote Sensing Conference held during October in Perth, ACRES held a meeting of its Distributor and Reference Centre organisations. The meeting was addressed by Carl McMaster, Manager ACRES, and Joe Gatto, Director — Asian Sales, EOSAT.

Carl McMaster discussed the current and future program for ACRES satellite data acquisition, processing and distribution and Joe Gatto outlined the status of the LANDSAT 6 program.

Paul Wise, Director ACRES Applications, gave a brief presentation on the role and directions to be taken by his group.

Ms Jenny Weissel, Marketing Manager, ACRES, conducted a workshop style presentation and discussion on the distribution and reference centre network. Distributors and Reference Centre representatives were interested in issues central to their operations, such as copy-right, royalties, value-added processing, marketing, training and performance of the ACRES production system.

Help us to help you!

Customer Services requests all clients to provide full details of their required area for coverage, preferably by inclusion of a map with their inquiry. This information will reduce the amount of processing time and ensure that the recommended scene provides the correct coverage.

Product Review

The ACRES data product range has been reviewed. The existing product range will be retained.

Clients are reminded that the floppy disk subsets for LANDSAT Thematic Mapper and ACRES SPOT data were added to the product range in August 1990. EOSAT's LANDSAT MSS and TM data products were added to the ACRES product range in October.

Due to the increasing number of customer enquires, ACRES is investigating the provision of digital data on other media such as Exabyte cartridge and optical disk. Therefore, written expressions of interest are invited from clients interested in purchasing data on these media. Any decision to change storage media will be based on the size of the customer base for the particular media type.

Geographic Information Systems

Rosalie Booth, Technical Advisor — Sales, is currently researching remote sensing/geographic information systems file exchange problems.

Communication is invited on this subject, particularly on new pathways developed between various systems. All communication should be addressed to Rosalie Booth.

Specific details on system file formats are requested from suppliers. For updating the characteristics of the IPS/GIS packages. Regular updates on specific information pertaining to import/export file formats are requested. In this way, current information can be provided to new and existing ACRES clients.

TM Captures Temple Bay

The Temple Bay area, site of the proposed Australian Spaceport, has been acquired by the Thematic Mapper sensor in spite of the perennial cloud problems in the area. The image is a quarter scene in area. A master negative has been generated.

ACRES SPOT Microfiche

Due to the large number of microfiche required for complete coverage of the ACRES SPOT data archive, individual fiche (to cover a specific area of interest), will be provided at \$5.00 per fiche plus postage/delivery charges.

Please contact either ACRES Customer Services (PH (06) 252 4407/9) or SPOT

Imaging Services in Sydney (PH (02) 906 1733) for sales of ACRES SPOT data.

Cloud Cover Assessment Surcharge

As mentioned in our previous newsletter, ACRES can supply cloud free data outside the normal cataloguing and ordering procedure on special request. Each data set requested by the client will be generated and examined interactively for the presence cloud.

The surcharge for this procedure is \$200.00 and will result in provision of a data set with zero cloud.

Please contact ACRES Customer Services for further details.

Floppy Disk Data Sheets

ACRES Floppy Disk Data Sheets containing information on LANDSAT MSS, TM and SPOT floppy disk subsets (including prices) are now available from ACRES Customer Services and Distributor organisations.

Clients should note that the diagram on Page 3 of the data sheet shows the top and bottom frame edge of the image subset parallel to the latitude. This is incorrect. The top and bottom boundaries of the image subset are perpendicular to the satellite path.

Subset image sizes are (lines, pixels) 512 X 512 for MSS; and 1000 X 1000 for TM and ACRES SPOT.

File formats supported are microBRIAN, ERDAS and A-Image.

DELIVERY OPTIONS ON ACRES PRODUCTS

The following options for domestic and international delivery will apply to ACRES orders:

1. DOMESTIC DELIVERY

Priority 3

By road freight only (the charges will be included in the product price). Customers may elect to change to air freight delivery but at their own cost. Exceptions will apply to small items such as microfiche envelopes which will be dispatched via Australia Post.

Priority Two & Priority One

Both these priority services will default to

air freight (charges will be included in product price).

2. INTERNATIONAL DELIVERY

These charges will reflect the actual costs of delivery charged to ACRES and will apply no matter what mode of delivery is requested (ie air freight, door-to-door courier or international express post). The latter is our default mode of delivery.

3. HANDLING CHARGE

A handling charge will be incorporated in the product costs for ACRES data but will appear as an extra item on all EOSAT data product orders.

CONFERENCE REPORTS

5TH AUSTRALASIAN REMOTE SENSING CONFERENCE

The 5th Australasian Remote Sensing Conference was held at Observation City Resort Hotel, Scarborough Beach, Perth from 8-12 October, 1990. A number of workshops and activities were held in conjunction with the conference. Details are as follows.

3RD MICROBRIAN USER GROUP MEETING

The third microBRIAN User Group meeting was held in Perth on 4-5 October, in conjunction with the 5th Australasian Remote Sensing Conference. ACRES was represented by Mr Craig Smith, ACRES Applications and Ms Sharelle Payne, Promotions Officer. The meeting attracted over forty users from a wide range of sites and applications areas. The annual meetings are scheduled to allow users to exchange ideas, report on work being undertaken and contribute thoughts and suggestions to the direction and form of future system development.

The scheduled speakers described various research and applications projects involving microBRIAN. These included the operational use of remote sensing for forest mapping in Victoria, trend corrections to SLAR imagery, deriving hydrological parameters from AVHRR imagery and integrating different spatial data sources. Mr Steve Dovey, Technical Project Manager for the Philippines-Australia Remote Sensing Project, also described the role of microBRIAN in this major AIDAB program.

Considerable interest was generated by the presentation of details of Version 3 of microBRIAN (due for release in December 1990) and a prototype system was demonstrated. Major features include large images (32767 pixels by 32767 lines, 256 channels), integer or byte precision, appending output channels to existing images, windowing and decimation of images during processing or display, image headers and trailers, networked file access, window-driven menus and on-line help, as well as a number of new image processing functions.

The presentations and displays reinforced the fact that Version 3 is NOT simply an upgrade of the microBRIAN program suite although it has been designed to be compatible with the Version 2 software. In Version 3, many key processes have been rationalised into a smaller, more flexible set of programs. For example, the specification of established and user-defined

mathematical transformations can now be executed within a single routine. Image categories can now be more flexibly defined as any logical combination of spatial features and spectral ranges, allowing GIS style analysis to be readily applied to microBRIAN images.

Version 3 software will be issued free of charge to subscribers to the microBRIAN software support scheme, or will be available as a software upgrade to established sites.

Further information on Version 3 can be obtained from MPA, 37-51 Lusher Road, Croydon, Vic, 3136 or telephone 03 724 4444.

NATIONAL WORKSHOP ON AGRICULTURAL REMOTE SENSING

A two day workshop on the operational use of remote sensing was also held prior to the Australasian Remote Sensing Conference on 5-6 October. The workshop brought together representatives from the remote sensing and agricultural communities. Delegates included members of land care groups, rural associations, academics, data suppliers and researchers from government department and the CSIRO.

The workshop discussed information requirements of potential users of remotely sensed data and the factors limiting the adoption of this technology. The program included:

- case studies by remote sensing specialists;
- presentations on information requirements of farmers in various sectors, land care groups, agricultural consultants and government advisors;
- workshop discussion groups.

Case studies illustrated the use of remote sensing in a range of agricultural applications including determination of pasture fertilizer requirements, detection of water-logging in crops, monitoring of irrigated cotton crops, management of arid rangelands and assisting district advisors in monitoring and planning regional land use.

The workshop recommended that pilot projects be established in each state/territory to demonstrate the use of remote sensing in agriculture. The pilot projects should cover a range of applications and methods of extension.

The proceedings of the workshop should be available in early 1991 and interested persons should contact the Publications and Information Section, Bureau of Rural Resources, GPO Box 858, Canberra, ACT, 2602 or telephone 06 272 4012.

ACRES REPRESENTATION

ACRES was well represented at the conference with Mr Carl McMaster, Manager; Mr Dennis Puniard, Director Operations; Mr Paul Wise, Director Applications; Ms Jenny Weissel, Marketing Manager; Ms Sharelle Payne, Promotions Officer; Mr Craig Smith, ACRES Applications and Ms Sandra Browne, Customer Services Officer all attending.

The ACRES trade display attracted considerable interest and a range of ACRES products, particularly georeferenced and geocoded products were on display. Value added products from ACRES Applications and EOSAT images over Chile and the US were also on display.

ACRES is now a Distributor of EOSAT data, the agreement was signed at a Cocktail Function held during the conference and hosted jointly by ACRES and EOSAT.

Ms Sandy Browne demonstrated the ARCOS "on-line" data base (via a rented VT320 terminal and modem) and also used the colour microfiche to assist customers with order enquires. A range of technical data sheets and promotional material produced by ACRES was also available.

Ms Jenny Weissel presented a paper by Weissel and Booth on "The Potential Use of Remote Sensing Technology by the Rural Finance Sector. In addition, a one hour poster presentation was given. Mr Norm Hindley (CSIRO, Division of Wildlife and Ecology) assisted Ms Weissel with the poster presentation.

INSTITUTION OF SURVEYORS (VICTORIA) NORTHERN GROUP'S CONFERENCE — "STEAMING INTO THE NINETIES"

On the weekend of September 8 and 9, some 70 Surveyors converged on Echuca (Moama to be precise) to hear, question and discuss topics on a wide range of subjects including cadastral reform and coordination, laser guided tunnelling and remote sensing.

A small technical display of surveying, drafting and LIS hardware and associated products was of interest to many of the participants.

AUSLIG was well represented. Rod Menzies (AUSLIG) and Paul Wise, Director, ACRES Applications both presented papers.

Although many of the attendees thought remote sensing was a technology with minimal benefits, a large number had experienced problems associated with undertaking projects where little or no recent information existed or where the information that did exist was difficult to find.

Many attendees were surprised to discover that remotely sensed images, with even low level corrections, could provide cost-effective, up-to-date information and/or temporal comparisons from data archived in one location.

During the conference a number of participants expressed concern at the lack of basic information on remote sensing. It appears, that prospective users are often "scared off" because the support documentation is for sophisticated users. These comments highlight the need to provide basic information for prospective, new and less sophisticated users whose requirements for information is often greater than those at the forefront of remote sensing technology.

The Conference was a very compact two and a half days. The next conference will be held in Albury early in 1991.

ACRES REPRESENTED AT AMIC ANNUAL ENVIRONMENTAL WORKSHOP

The Australian Mining Industry Council's (AMIC) 15th Annual Environmental Workshop was held in Wollongong from 8-12 October 1990. Mr Laurie Oliver, ACRES Applications presented a display of LANDSAT and SPOT data to promote remote sensing to environmental and land rehabilitation officers within the mining industry.

There were 177 registered delegates, representing mining companies, universities and government departments. The workshop consisted of formal papers (presented in plenary session), site visits and workshops.

A display area was situated outside the main lecture hall and the ACRES display attracted general interest from delegates.

Proceedings from the workshop will be available from AMIC, PO Box 363 Dickson, ACT, 2602. Interested persons should contact Ms Julie Anderson, telephone 06 249 8955.

ERS-1 SAR PROJECT

Some time ago, the Department of Industry, Technology and Commerce (DITAC) awarded British Aerospace



ACRES Display Stand — 5th Australasian Remote Sensing Conference

Australia (BAeA) an \$8 million contract for the construction of receiving and processing equipment for data from the ERS-1 SAR. The reception equipment is now installed at the ACRES Data Acquisition Facility (DAF) in Alice Springs and the fast delivery processor (FDP) will be installed at the ACRES Data Processing Facility (DPF) in Canberra in early 1991.

Until ERS-1 is launched and acquiring data, however, the system will not be able to be fully tested and evaluated. ACRES will initially provide products only to the 18, ESA approved, Australian investigators and later to third parties.

ERS-1, the European Space Agency's (ESA) first remote sensing satellite, is due to be launched on an Ariane 40 rocket towards the end of April 1991. A follow on satellite ERS-2, almost identical to ERS-1, is now programmed for launch in 1994.

ERS-1 has two major missions. The first, the Global Low Bit Rate (LBR) Mission, is to provide as much global coverage as possible with the Radar Altimeter and maximum coverage of oceans and seas with the Wind Scatterometer. The second or SAR Mission (also known as the High Bit Rate, HBR, Mission) aims at obtaining regional coverage of land/ice surfaces and coastal areas.

The Along Track Scanning Radiometer (ASTR) and the Microwave Sounder will operate on a permanent basis provided there are no limitations to the power supply or data recording. However, only the SAR or HBR data is to be recorded and processed in Australia.

ESA propose to vary the repeat cycle of ERS-1 from 3 days to 35 days and up to 176 days towards the end of its planned life. However, the majority of the time, ERS-1 will have a repeat cycle of 35 days.

Products from the Australian Fast Delivery Processor (FDP)

The FDP will initially run at 1/50th real time (a computational load requiring the equivalent of 1000 standard PC's) and will initially generate only minimally corrected products on computer compatible tapes (CCT) only.

The two levels of product planned for generation are:

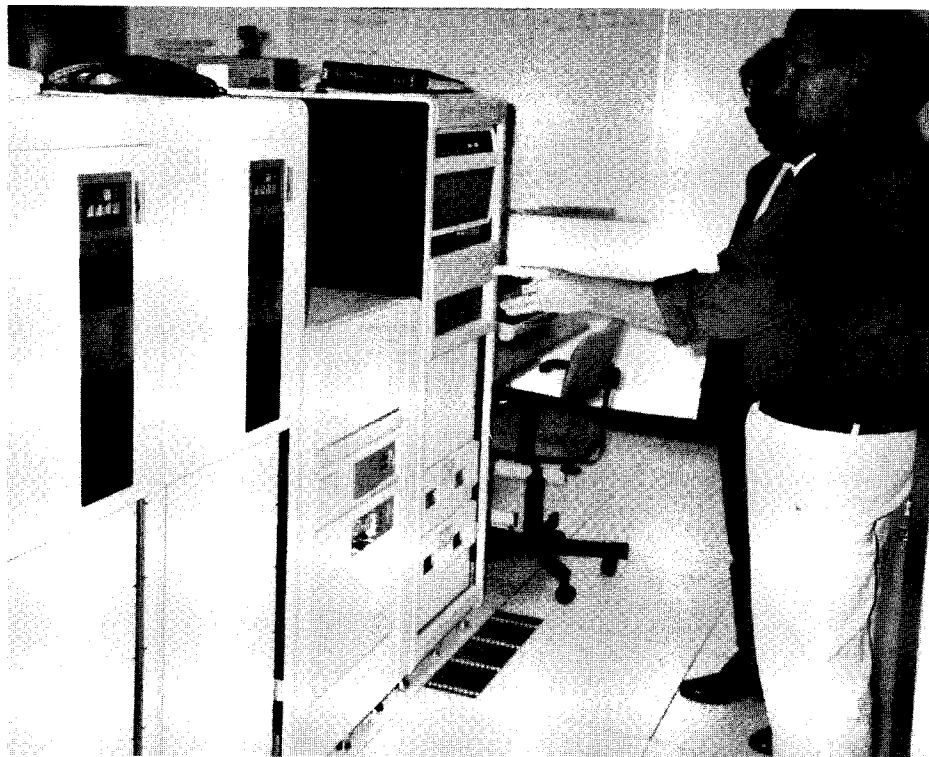
1. ACRES SAR LEVEL 0.5 (AU.SAR.0.P000[RD*i*]) will have the telemetered range line data stripped from the auxiliary data and include the annotated spacecraft parameters. The data will be in CEOS format. A nominal 100km x 100km scene will use 4400ft of tape at 6250bpi.
2. ACRES SAR LEVEL 1.0 (AU.SAR.1.P100[FD*c*]) will be correlated data without radiometric or geometric corrections. The SAR parameters and orbit data may be appended and range migration correction is optional. The data will be in CEOS format. A nominal 100km x 100km scene will use 970ft of tape at 6250 bpi. This would appear to be the data most users would require for their applications.

Specifications of the sensor, based on the operational parameters of the ERS-1 SAR are as follows:

| | |
|------------------|----------------------------|
| Wavelength: | 57mm, 5.263GHZ (C band) |
| Polarisation: | VV |
| Look angle: | 23 degrees |
| Bandwidth: | 15.5MHz |
| Antenna length: | 10m |
| Number of looks: | 4 |

The ground resolution in range will vary from 24m to 34m; and the ground resolution in azimuth will vary from 16m to 18m after processing to 4 looks. Best single look resolution in azimuth is 6.5m.

The FDP will resample to nominal 20m pixels in range and around 16m in azimuth. A scene will nominally contain 5000 pixels in range and 6300 in azimuth giving a nominal 100km x 100km scene. The data will be either 8 or 16 bits. The geographic location of eight equally spaced perimeter points (including the four corners) and the scene centre will be provided based initially on GEM6 (Goddard Earth Model 6). These locations should be accurate to +/- 350m in azimuth and +/- 120m in range.



The Senior Engineer at Alice Springs, Warren Serone, pictured explaining the layout of the new equipment to Mr Nik Mahmood, Director of the Malaysian Centre of Remote Sensing, during a recent visit to ACRES, Alice Springs.

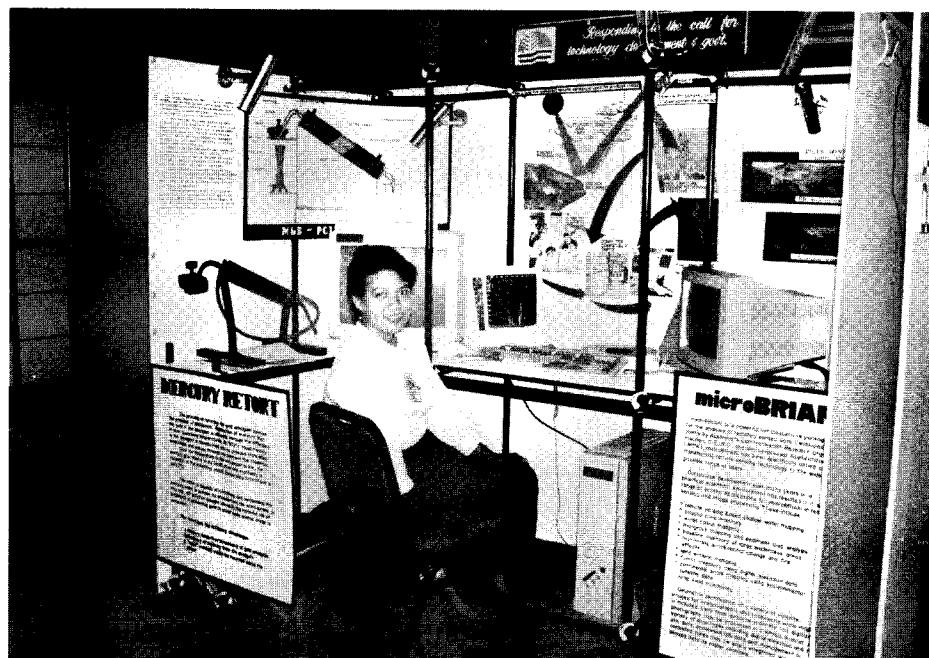
REPORT FROM THE PHILIPPINES

Dr Debbie Kuchler, Mapping & Monitoring Technology Pty Ltd and Ric T. Bina, Deputy Administrator, NAMRIA, advise that the AIDAB funded projects of the Natural Resources Management and Development Project (NRMDP) and the Philippines Remote Sensing Centre Project (RSP) co-operated in publicly displaying Australia's aid contribution to the digital mapping and monitoring of the Philippine environment.

The National and Resource Information Authority (NAMRIA) together with the Mines and Geo-Sciences Bureau represented the Department of Environment and Natural Resources in the 5th Government Productivity Improvement Exhibit contest.

Ms Ruth Valderrama from the NAMRIA based NRMDP project demonstrated the operational use of Australia's MicroBRIAN image processing technology.

The MicroBRIAN system was provided by the NAMRIA-RSP project and the display was prepared by the NAMRIA Media Division.



PRODUCTION NEWS

Karl Nissen, Production Controller reports on the status of the ACRES production system. Karl hopes that this column represents the first instalment of a regular report for ACRES News.

Optronics Imagewriters

ACRES has two Optronics Imagewriters attached to the MSS data processing system. The Imagewriters are presently used to produce MSS photographic products; and for black and white image-writing. Unfortunately, products recently produced by the Imagewriters have suffered problems due to worn parts. Consequently, production of acceptable images has fallen and both machines are currently unserviceable. Parts for refurbishment of both machines are on order but delivery could take many months.

Customer Image writing

Fortunately, ACRES has been able to transfer all customer imagewriting to the MDA COLOUR FIRE 240 Imagewriter. All black and white imagery is being written as monochrome images on colour film, with companion prints and transparencies being printed on colour paper or film.

Please Note, that customer image writing tapes for the MDA COLOUR FIRE 240 can be supplied in either 6250 or 1600 bpi format.

MSS Photographic products will also be written on the COLOUR FIRE 240 using a variant of the customer image writing process. Colour products will be written to colour film and black and white images will be written as monochrome on colour film. The only change to MSS photographic products will be in the film annotation. Imagery content and size will be identical to that written on the Optronics.

Reliability and image quality on the MDA COLOUR FIRE 240 has been very good lately. Investigations into the static problem associated with black and white film is continuing.

PHOTOLAB NEWS

In these days of rapidly advancing technology it may be all too easy to miss the beginning of a new era. We strive to keep pace with changes in the photographic world and to incorporate worthwhile advances into our products.

Included in our current investigations are such items as polyester based print materials that are exceptionally durable, in fact so durable that it is almost impossible to tear them. Yet, the new material

shows excellent tonal reproduction and brilliant contrast. (A great advance for people using satellite imagery in the field.)

New Kodak technology

At Photokina, the worlds largest photographic exhibition, Kodak announced its latest addition to the range of digital imaging. Kodak are manufacturing an electronic "back" that may be added to a 35 mm camera. The "back" contains a CCD capable of recording 1.3 million pixels and storing them on a portable hard disk that can store up to 160 full colour images.

Another Kodak device is the digital continuous tone printer. This device uses thermal dye sublimation transfer technology to produce true continuous tone prints and transparencies without chemical processing. Prints may be black and white or full colour and can be produced in as little as 35 seconds.

The Durst Enlarger

To cater for requests to provide enlargements up to 10 times, ACRES have installed some additional track for the Durst enlarger. After imminent recalibration, such enlargements will be available.

Super Fractal

The ACRES Photolab recently produced 12 large prints for a super fractal mosaic which will be on display in the main foyer of the National Science and Technology Centre from December. The super fractal was generated on a Fijitsu VP100 Super Computer by Dr Bruce Henry and Dr Murray Batchelor, Mathematicians in the Department of Theoretical Physics at the Australian National University.

Super fractals are associated with Chaos Theory and are mathematical models of dynamic systems. The detail displayed in the (pictorial) output is a result of the models sensitivity to its initial conditions.

The fractal image on display at the National Science and Technology Centre was produced and sponsored by ACRES Imagewriting Service.

For more information on ACRES Customer Image Writing please contact ACRES Marketing and Sales.



SATELLITE MAPS

A global map of earth, based totally on multinational satellite imagery, will be compiled as part of the 1992 International Space Year (ISY) Celebration honouring the 500th anniversary of Columbus' discovery of America. The \$30 million project was approved during a meeting in Kyoto, Japan, of space officials representing all the major space agencies of the world.

NOAA & EOSAT CONTRIBUTE TO GLOBAL CHANGE RESEARCH

The Earth Observation Satellite Company (EOSAT) and the National Oceanic and Atmospheric Administration (NOAA) have negotiated an agreement to make some Tremote sensing data acquired by the LANDSAT Multispectral Scanner (MSS) available to support the international global change research effort and other environmental applications.

The availability of MSS data will aid researchers in developing new technologies in the application of remote sensing data for global change monitoring. Advanced technology applications will increase the value and utility of data sets to be introduced by the next generation of LANDSAT satellites and other remote sensing platforms.



CONFERENCE CALENDAR AND COMING EVENTS

PTC's 13TH ANNUAL CONFERENCE — PTC '91

"Accessing the Global Network: Weaving Technology and Trade in the Pacific"

Honolulu, Hawaii
Jan 13-16 1991

For further information contact:

Pacific Telecommunications Council
(PTC)
Suite 308
1110 University Avenue, Honolulu,
Hawaii 96826 U S A

INTERNATIONAL SOCIETY FOR PHOTOGRAMMETRY AND REMOTE SENSING (ISPRS) FIFTH INTERNATIONAL COLLOQUIUM

"Physical Measurements and Signatures in Remote Sensing"

Courchevel, France
Jan 14-18 1991

For further information contact:

Courchevel Reservation
Le Croisette
73120 Corchevel
FRANCE

NATIONAL AGRICULTURAL AND RESOURCES OUTLOOK CONFERENCE

"OUTLOOK '91"

National Convention Centre
Canberra, Australia
Jan 29-31 1991

ABARE has convened a national outlook conference annually since 1971. The OUTLOOK '91 conference program will include sessions on the individual mineral, energy, crops, livestock and fisheries commodities. A trade display will be held in conjunction with the conference.

Further details can be obtained from:

Conference Secretariat
OUTLOOK 91
PO Box 1563
CANBERRA ACT 2601

AUSTRALIAN SOCIETY OF EXPLORATION GEOPHYSICISTS 8TH CONFERENCE AND EXHIBITION

"Exploration in a Growing Environment"

Sydney, Australia
17-21 February 1990

The theme of the conference reflects the growing recognition by the resource industries challenges arising from technological advances and the changing community requirements.

A trade display will be held in conjunction

with the conferenc. For further information contact:

Conference Secretariat
1991 ASEG-GSA Conference
PO Box 925
CROWS NEST NSW 2065

THIRD INTERNATIONAL CONFERENCE ON GEOGRAPHIC INFORMATION SYSTEMS

Ottawa, Canada
Mar 18-21 1991

The main themes of this conference include management issues, applications and case studies, technology issues and education and training. Further information can be obtained from:

The Canadian Conference on GIS
Box 5378
Station F
Ottawa
CANADA K2C 3J1

EIGHTH THEMATIC CONFERENCE — GEOLOGIC REMOTE SENSING

"Exploration, Engineering and Environment"

Denver, Colorado, USA
Apr 29 — May 2 1991

The program will comprise over 200 technical presentations covering all aspects of geological remote sensing from fundamental principles and techniques to advanced data processing and geological interpretation. Further information can be obtained from:

ERIM/Thematic Conferences
PO Box 8618
ANN ARBOR,
MI 48107-8618

INTERNATIONAL AEROSPACE CONGRESS 1991

"Focus on the Future"

Melbourne, Australia
May 12-16 1991

The conference program will incorporate papers addressing the theme of advancing aerospace technology and international collaboration. Further information can be obtained from:

The Conference Secretariat
International Aerospace Congress 1991
GPO Box 358F
MELBOURNE VIC 3001
AUSTRALIA

1991 NATIONAL TRANSPORT CONFERENCE ASSOCIATION OF REMOTE SENSING LABORATORIES (EARSEL)

"Microwave Imaging and Related Techniques Workshop"

Alpbach, Austria
May 13-15 1991

Ispra, Italy
May 16-17 1991

For further information contact:

Dr A J Sieber
Institute of Remote Sensing
Applications
Joint Research Centre
21020 Ispra, Varese, Italy.

1991 NATIONAL TRANSPORT CONFERENCE

"Transport Shaping Australia — issues and opportunities"

Brisbane, Australia
1-3 May 1991

The 1991 National Transport Conference will investigate issues and concerns related to changing transport needs. For further information contact:

Conference Manager
The Institution of Engineers, Australia
Transport Conference
11 National Circuit
BARTON ACT 2600

EUROPEAN ASSOCIATION OF REMOTE SENSING LABORATORIES EARSEL 11TH SYMPOSIUM

Graz, Austria
3-5 July 1991

The Symposium and workshops will take place at the University of Graz. During the symposium, an exhibition of commercial and non-commercial products, publications and services will be arranged. For further information contact:

The Secretariat
EARSEL
BP 209
F-92108 Boulogne-Billancourt
FRANCE

AURISA '91

"Towards 2000 — Information: A sunrise industry"

Wellington, New Zealand
19-22 November 1991

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