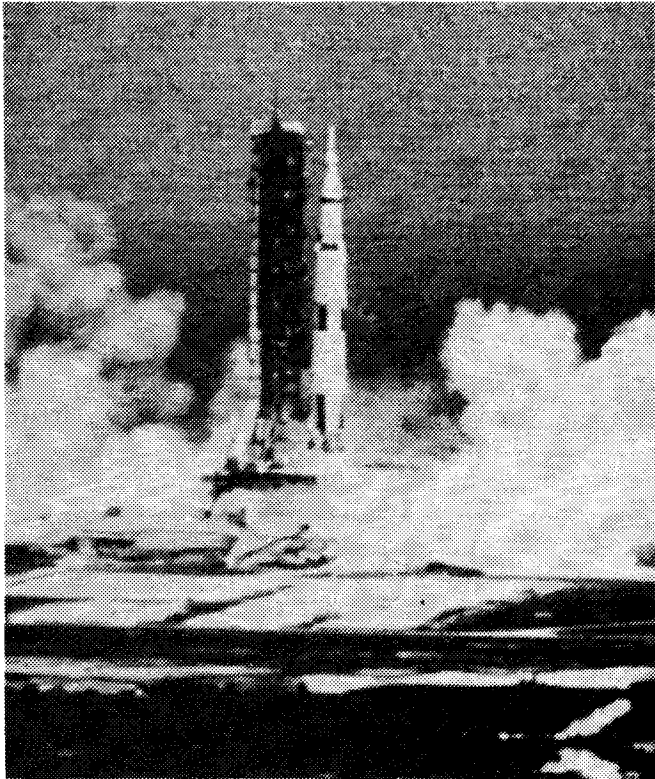


NEWSLETTER



Successful Landsat 5 launch

Landsat D prime was launched from Vandenberg Western Test Range at 17:59 zulu time on March 1, 1984. At the time of printing the solar array had been deployed along with the High Gain Antenna. MSS and TM (Bands 1-4) data had been acquired by NASA and processed with excellent results. TDRSS testing was to begin on March 10. The spacecraft should be on the World Reference System eight days displaced from Landsat 4 by April 5 with normal operations commencing on April 6.

Several design changes have been made to Landsat 5 to correct for the Landsat 4 orbital failures. These include the redesign of the solar array prime power cables to include conventional

round stranded wire, woven flat cable configuration, crimp termination at connectors, stress relief clamps at connectors and added stress relief loops near connector termination points.

The central unit has also undergone a redesign to include ceramic capacitors in place of tantalum capacitors at all points in the central unit that can be damaged by an intermittent short. One of the two control units on Landsat 4 failed on October 29, 1982, 3 months after launch. Failure of the second control unit would result in loss of the spacecraft.

The X-band frequency source amplifiers on Landsat 4 failed in orbit due to a design problem. This problem has been hopefully overcome on Landsat 5 with a redesign of both the X-band and K-band amplifiers to include lower drive level into the second stage amplifier and modified mounting for the 4001 transistor substrate to relieve excessive stress.

Other enhancements made to Landsat 5 include enhancements to the on-board computer software, filters added to the MSS detector outputs to reduce coherent noise and a release spring added for initiating boom deployment.

Both Landsat 5 acquisition calendars and Landsat 4/5 Path/Row acquisition maps are now available from ALS.

The acquisition calendar lists the local dates of all the Landsat 5 overpasses within the ALS acquisition capability from April 1984 to March 1985.

The Path/Row acquisition map is based on a Natmap 1:5,000,000 series topographic map of Australia. Since ALS records data over PNG and some of Indonesia, the base map has been extended to cover this acquisition capability. The resulting 1:5,000,000 map is printed in the standard eight colours with the Landsat 4/5 Paths and Rows overprinted in purple.

The map can be purchased in either flat or folded form, the acquisition calendar is free upon request.

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Remote sensing technology has developed beyond the research and demonstration stage and is now a well established method for mapping and assessment of the earth's resources. The transfer to the portfolio of Resources and Energy will have the advantage of closely associating ALS activities with a section of the user community and will assist in integrating satellite remote sensing with mapping and aerial photography.

It is my intention that, within the limits of the resources provided, the ALS will continue to provide a service which is highly responsive to the user community's needs. I shall be giving my personal attention to such matters as up-grading, marketing and the introduction of improved products and services.

Con Veenstra
 Director
 Division of National Mapping



Australian News

ALS identification on LGSOWG tape format

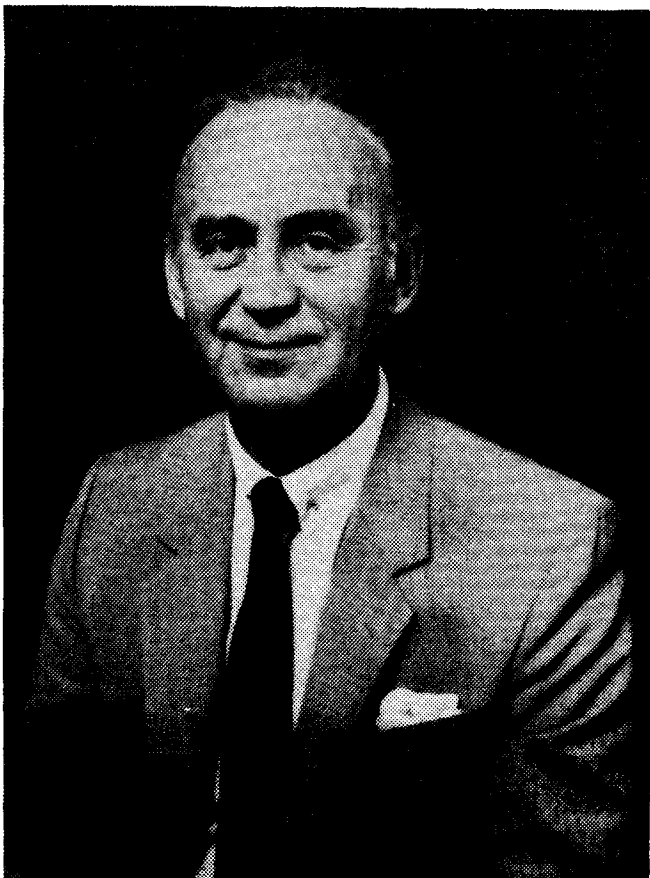
The format specifications for Eros Data Centre LGSOWG Interchange tapes, defines the field PHOTOID as an alphanumeric field of 13 characters — the first two to be used as system and station identifiers, and the remaining 11 to be used as scene identifiers. The Landsat system is assigned the value 8 for the first Character position in the NOAA Data Base. The second character is assigned the value G for Australia. The Australian Landsat Station has previously left the remaining 11 characters in the form of the standard NASA scene ID, as tape Leader annotation for identifying Australian scene images.

The system of image identification used at the Australian Landsat Station is based on Path, Row and Date. To facilitate image orders from international customers, and to allow easy reconciliation of ordered images with the ALS scene data catalogue, it has been decided to assign ALS identification to PHOTOID. The image identification scheme used is of the form:

PFPRRDDMMYY

— where PPP = Path
 RR = Row
 DD = Day
 MM = Month
 YY = Year

Comments from users wishing to order by PHOTOID will be welcomed. For full details of the LGSOWG International Data Base Format, users can contact ALS, or refer direct to the Eros Data Centre.



Con Veenstra

Under new management

On 1 March 1984 responsibility for the Australian Landsat Station was transferred from Space Projects Branch of the Department of Science and Technology to the Division of National Mapping of the Department of Resources and Energy.



MOMS test provides new scanner data

The Modular Optoelectronic Multispectral Scanner system developed under contract for the West German Aerospace Research Establishment was recently tested in orbit aboard the Shuttle Pallet Satellite, during Shuttle Mission 7. The tests provided the first operational use of pushbroom imaging techniques for civil space remote sensing, with encouraging results. Image samples were acquired in two spectral bands: centred on 500 nanometres in the visual range, and 2.3 microns in the far infra-red.

The system utilises Charge-Coupled Device (CCD) array technology allowing the use of static optics in the pushbroom configuration, giving higher reliability to the scanner. The configuration provides image scanning on one axis from orbital motion of the instrument aperture, and on the axis orthogonal to the orbit path from electronic scanning of the CCD sensor array. The solid-state, low voltage CCD technology is more compact than other electronically scannable photo-detectors, and is considered more reliable. During the early phase of CCD development, the yield of complete arrays with uniform characteristics was very low. However, the ability to obtain high quantum efficiencies and wide spectral responses with suitable semiconductor substrates and selective doping, added promise to the stability, reliability, and low power requirements obtainable with a solid-state imaging device. That promise gave sufficient impetus to the realisation of practical CCD arrays, and their subsequent application to pushbroom imaging techniques.

The scanner arrangement in the MOMS system provides 20 metre square spatial resolution — splitting the difference between SPOT at 10 metres and the Landsat 4/5 series Thematic Mapper at 30 metres ground resolution. This has provided more than adequate photo-interpretive detail in the MOMS test images at 1:1 scales, and is unaffected by increasing the spectral resolution. In contrast, SPOT 10 metre resolution will only be available in a panchromatic band. The MOMS system permits the addition or deletion of scanner modules at will — increasing or decreasing coverage of spectral bands without changing spatial characteristics. The flexibility of this scheme fits well into the general trend to more selective data acquisition, and elimination of redundant scene information at scanner level.

The use of the Shuttle Pallet Satellite system (SPAS) to deploy the MOM Scanner in orbit and retrieve it at the end of each mission provide the ability to make any change to the Scanner that might seem appropriate. The only limitations currently imposed by the use of SPAS are the length of time over which data can be acquired, and the restricted equatorial orbits of Shuttle missions to date. These limits are offset to some extent by the virtual lack of constraint on data bandwidth, and the facility of the nearby shuttle on each mission for backup power and command signal transmission.

The possible later addition of film return systems, radar, and a stereo imaging capability would give the SPAS/MOMS combination even greater credibility in the increasingly competitive space remote sensing field.

The initial acquisition of data will be for users who commission the consortium on an individual basis. The Comsat Corporation, as a member of the consortium, will provide a US based data management centre for acquiring and handling imagery. A European centre will possibly be established later. The acquired data belongs to the user and, by virtue of this system, remains proprietary information. Later marketing plans for data envisage regional distributors acquiring large blocks of MOMS imagery, and re-selling to local users. Australia is one of the countries being assessed for its potential in this regard.

ISPRS Conference — Rio, Brazil

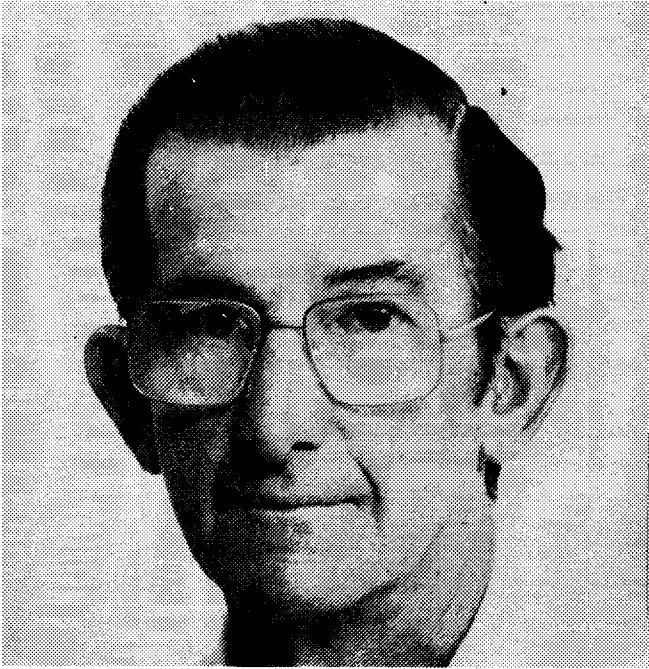
The XV International Congress of Photogrammetry and Remote Sensing will be convened in Rio de Janeiro, Brazil, from 17 to 29 June 1984. This will be the culmination of four years of productive activity by the 69 member organizations and the seven Technical Commissions of ISPRS.

The Brazilian hosts have prepared a superb programme of technical sessions, exhibits, social events, and excursions which are described in the announcement. There will be ample opportunity for professional stimulation, for meeting the international community of photogrammetry and remote sensing, and for enjoyable personal experiences. Rio de Janeiro and the surrounding country are one of the world's favoured vacation areas. You should not miss this opportunity to visit at the best time of the year.

Further information is available from our Applications Specialist, Mr Steve Dovey on (062) 52 4406 who will be attending the above conference.



Profile



Often the voice users hear on the other end of the telephone is that of Ted Donnell, the User Services Officer at DPF. Ted has a long working experience of liaison with user groups of one kind or another. He began his career in the trades area, working with the federal Department of Supply at a time when computer records began to be kept for maintenance costs and schedules on plant and equipment. After some planning and supervisory work, Ted was sponsored on a Methods and Work Study course in 1962. He subsequently provided the technical liaison between ADP bureau staff and the trades groups automating their maintenance records.

In 1969, Ted moved on in the Australian Public Service — moving to Canberra, the National Capital, and moving into a new Work Study Section in the Department of Interior, Ted's new role subsequently involved him in studies in public administration, ADP systems analysis and design, and in network analysis. During this time he worked for both the Department of Interior, and the Department of Supply on management control and reporting systems.

At the beginning of the period of rapid expansion in the public sector during 1972/73, Ted was ideally placed to work in an Australian Government Management Consultancy Unit concerned with the review of Public Service clerical methods and procedures. This involved the application of PERT and work sampling techniques to the characterisation and forecasting of work load trends in the Department of the Capital Territory which is responsible for the management of Canberra and the Australian Capital Territory.

When restrictions were placed on further growth of the public sector in 1977, Ted applied both his early trade training and his management techniques to the operation of his own building

maintenance business. Ultimately, this proved uneconomic in the face of the recession, and cuts in public sector spending on maintenance. At this point, Ted moved to the post of User Services Officer with the Australian Landsat Station DPF in Canberra. Since then he has successfully applied his abilities to liaison with the State Browse Centres, with micro-image and micro-data catalogue subscribers, and with a wide range of local and international data users.

Ted is a settled Capital Territory resident, with a grown family and grandchildren. His hobbies centre on his home workshop, and much of his spare time is devoted to caravanning. A recent national caravanning convention in Canberra owes much to Ted's organisational ability — he is a member of both local and international caravanning associations.



ALS Diary

Landsat 84 Conference

Organisation of the Landsat 84 Conference is well under way with only a few weeks to go. The Conference will feature technical sessions, a trade display, workshops and think tanks. Those who have not yet registered should do so immediately, as there is a limit to the number of delegates.

Invited speakers will include Dr L. Rowan USGS, who's paper is entitled "Current Needs In Remote Sensing For Geological Applications", Mr W. Eskite Jr from NOAA who will speak on "U.S. Remote Sensing From Space By Government Or Industry", and Mr R. Bryan Erb from the Lyndon B. Johnson Space Centre who will talk on "Agriculture Remote Sensing Status And Outlook". Apart from a keynote address by Dr K. McCracken, there will be approximately 90 other papers presented by both Australian and overseas speakers.

A feature of this conference will be nine workshops and six think tanks. The workshops will cover all areas of Remote Sensing whilst the think tanks should stimulate plenty of discussion.

The equipment exhibition will feature Australian and international companies. A highlight of the exhibition will be a display of image processing equipment.

A full set of social events will cap off what is building up to be the largest and most successful Conference that those involved in the Remote Sensing and Related fields cannot afford to miss.

Further details are available from:

The Secretary
Landsat 84 Conference Committee
PO Box 234
BRISBANE, QUEENSLAND
AUSTRALIA

University of New South Wales short course

Sensing Satellites and Systems

3-day course, 16-18 May 1984,
This is a pre-Landsat 1984 special.

A course that will provide a working knowledge of present and future satellite systems, visual, digital analysis techniques and applications of Remote Sensing. The course will be useful to those attending the Landsat '84 Conference to be held the following week at the Gold Coast. Course fee \$200.00 including course material.

Further details available from:

Ms Rosie Garth
Centre for Remote Sensing
UNIVERSITY OF NEW SOUTH WALES
PO Box 1,
KENSINGTON, NSW 2033
Phone: (02) 662 3648
662 3002

12th ICA Conference

The Australian Institute of Cartographers extends a warm invitation to cartographers and geographers throughout the world to come to Perth for the first ICA Conference to be held in the Southern Hemisphere.

Australian cartographers are proud of the standards that they have set for map making and for the educational courses in cartography that have been established. Western Australian cartographers are justly proud of the significant contribution they have made to the opening up of this vast State of 2.5 million square kilometres.

Further information is available from:

The Conference Director
PO Box 6208
EAST PERTH WA 6001

- 1 Better grey scales;
- 2 Better colour separation;
- 3 More apparent detail;
- 4 More apparent contrast.

Stability of sensitometric control and subsequent ease of printing was most evident to photo-lab personnel.

The Australian Landsat Station was the first to develop the 3-band-positive, colour bulk image that all users now accept as the norm. This is superior to the tri-colour separation methods in a customer-orientated production environment, where fast turnaround of orders is essential. The Station began production using Kodak S0-278 colour film with normal E6 processing. While this film proved very successful for positive master production, it became necessary to supply a third generation image to users. This situation, although satisfactory, is not ideal — and the search began for a better system, resulting in the S0-200 products.

It is generally accepted that photographic reproduction stages accentuate the departure of the first generation from the ideal. Saturated colours become darker and may change hue; pale colours become paler and lose saturation. Through successive generations the tone contrast increases so that highlight details are lost, while the shadow areas become excessively black. These factors all contribute to changes in image resolution through successive generations. For the photo-technically minded, the following is a comparison of positive and negative system first generation Modulation Transfer Function (MTF):

Item	MTF Cycles/mm Spatial Frequency				Response
	5	10	20	50	
1	100	80	50	15	%
2	125	100	69	18	

ITEM FILM TYPE

- 1 Ektachrome S0-278
- 2 Kodacolor S0-200

Kodak are also striving to improve their products, and have developed a new Kodacolor emulsion. Early in 1984 ALS will receive supplies of the new S0-200 VR film coated with the advanced emulsion. This new film contains various changes in coupler and image dye chemistries, including:

- 1 New Development Inhibitor Release (DIR) technology for Improved speed, grain and colour;
- 2 New yellow coupler for increased sharpness;
- 3 New cyan coupler for improved dark-keeping properties.

Before using the new emulsion in production work, ALS photolab staff will carry out tests to ascertain any significant differences between the new and current S0-200 emulsions.

Tony Chiles, Photographic Specialist
Mike Linney, Digital Laboratory

Technical Notes

Second generation photo-imagery for ALS users

Previous ALS Newsletters have reported on the testing and acceptance of Kodak's S0-200 240mm colour negative film for use in photo-master production. The results so far obtained indicate that the direct negative method is superior to the 'Positive Master' system, and consequently S0-200 has gone into the production of all Landsat-4 images since 1 April 1983. All prints produced from the direct negative system are superior to those produced from the positive masters in the following ways:



Applications Notes

AESIS: Australian Earth Sciences Information System

The Australian Mineral Foundation has been established as an independent national institution by the mining and petroleum industries operating in Australia. Its administration represents mining and petroleum industry professionals; together with the Federal Department of Resources and Energy; the CSIRO; and Australian Universities and Tertiary institutions. The principal function of the Foundation is to maintain a high standard of professionalism in the Australian Mineral Industry through continuing education courses.

In addition, the AMF offers a wide range of information services based on its operation of a specialist earth sciences library. Apart from the normal reference services, there is a strong information dissemination program which includes computer-based current awareness information services such as an active book review scheme.

In line with these activities, the AMF acts as co-ordinator for the Australian Earth Sciences Information System (AESIS). This is a national reference data base covering both published and unpublished Australian Earth Sciences Information in a single system. It functions as a complementary service to the many federal and state information systems for the Australian geoscience community. New information recorded in the data base each quarter is available as hard copy by subscription to a publication known as the AESIS Quarterly. A progressive cumulation on microfiche in 5 year segments is also available.

In particular, publication lists known as AESIS Special Lists are produced on a number of topics from the data base. The lists are published in the same format as the AESIS Quarterly, together with any or all of seven possible associated indexes. The indexes cover subject, locality, mapsheet (250 000/100 000), author, mine/deposit/stratigraphy. Where possible, citations are grouped under broad subject categories — with up to 70 categories. Users of satellite data are currently catered to with AESIS Special List No. 12: Remote Sensing and Photogeology. It is intended that the lists will be a continuing series, with periodic updating of topics as required.

On-line retrospective searches of the AESIS data base are available by contract through AMF — or on AUSINET, the Australian Information Network. AMF also has on-line access to international data bases and offers a search service in the full range of geoscience disciplines through DIALOG Information Retrieval Service; SDC Search Service — ORBIT; QL Systems (Canada); European Space Agency — ESA Information

Retrieval Service (Frascati, Italy); INIS — AAEC; and Pergamon INFOLINE (London).

For further details, contact:

The Australian Mineral Foundation
Conyngham Street,
PO Box 97 Glenside
SOUTH AUSTRALIA 5065
Phone: (08) 79 7821



New Developments

Landsat reference centres

The first two Landsat Designated Reference Centres have been approved, one in Brisbane at the Research and Development Branch of the Queensland Department of Mapping and Surveying and the other at the Economic Geology Research Unit of the James Cook University in Townsville. They are available for professional advice and consultation to users.

Each centre will build up a library of imagery for use in the advisory or consultative process and will have access to analytical and interpretative systems to assist in this field.

It is hoped that a network of these Reference Centres will be created throughout Australia at tertiary institutions and other suitable establishments which have the facilities and staff to provide the required level of service to the user community.



Natmap News

The Director of the Division of National Mapping, Mr Con Veenstra, returned from overseas on 27 March 1984 after visiting Washington, Paris and Zurich.

The Washington visit was to sign the Memorandum Of Understanding between the national Oceanic and Atmospheric Administration (NOAA) and the Department of Resources and Energy. NOAA has taken over from NASA as the U.S. Federal Agency managing the operational Landsat program.

The Memorandum provides for:

1. direct access to NOAA's Landsat satellites by ALS;
2. availability to NOAA and others of Landsat data acquired by ALS.

The Memorandum is for a period of three years.

The visit to Paris was to consult with the Centre Nationale d'Etudes Spatiales (CNES) on the SPOT satellite. Discussion centred on the conditions which would apply to the acquisition of data in Australia, details of the acquisition and user expectations.

THREE AUSTRALIAN TEAMS CHOSEN BY NASA TO PARTICIPATE IN SHUTTLE IMAGING RADAR EXPERIMENT

Three research teams from Australia have been selected by NASA to carry out experiments as part of the SIR-B (shuttle imaging radar-B) experiment scheduled to commence with the 17th flight of space shuttle in August 1984.

A multidisciplinary group from the University of New South Wales will evaluate the potential of radar imagery for surface and subsurface mapping in arid lands, for urban monitoring, topographic mapping and crop management. Principal investigator for this group, Dr John Richards, Director of the University's Centre for Remote Sensing said that the experiments would be carried out at Fowler's Gap (the site of a University research station), Sydney, Pooncarie, the Amadeus Basin in the Northern Territory and in the New South Wales wheat belt.

Dr Frank Honey, Principal Research Scientist with the CSIRO Division of Groundwater Research in Perth is principal investigator for a CSIRO-Bureau of Mineral Resources consortium of experiments. These include mapping surface features at Lake Eyre in South Australia, monitoring salinity in the Western Australian wheat crop,

investigating geobotanical effects in Weipa, North Queensland, studying ocean currents in Bass Strait, mapping the Great Barrier Reef and studying limonitic lags in arid regions.

The third Australian team comes from the Department of Defence. Principal investigator, Neil Bryans of the Electronics Research Laboratories, Defence Research Centre, Salisbury, South Australia said his group is interested in detectability and discriminability of corner reflector targets placed in regions to be imaged by the radar.

The SIR-B synthetic aperture radar system will be the third spaceborne imaging radar to be flown. The first was SEASAT in 1978 and the second, the SIR-A package, carried on the second flight of space shuttle in November 1981. Unlike the previous two however, SIR-B data will be available over a range of incidence angles. All three operate at L-band.

Principal investigator for the SIR-B project worldwide, Dr Charles Elachi, was in Australia recently with a science team from the Jet Propulsion Laboratory in Pasadena, California, visiting sites of the Australian experiments.

Australian Landsat Station

Contributions and comments from readers of the ALS Newsletter are always welcome. Contributed articles should be as brief as possible and indicate the general category of interest. Authors please append comment on the context of the article — and include a brief personal resume.

The ALS Newsletter is published and distributed free in the interests of information exchange within the ALS user community. Comment concerning ALS products, services, systems, and related remote sensing activities is the responsibility of the Australian Landsat Station and is subject to change with changes in operational status. Reference to other publications; to applications by users; to data interpretation, services and systems; and to research programs is made at the discretion of ALS, and is published in good faith.

Subscription applications from readers with an interest in remote sensing not already included on the ALS Newsletter distribution list are welcome. Readers with colleagues in the remote sensing field who do not receive the Newsletter are invited to forward applications on their behalf. Applications and address amendment forms are provided in the space below for convenience.

All correspondence should be addressed to:

'ALS NEWSLETTER'
PO Box 28
Belconnen A.C.T.
2616
Australia

ALS NEWSLETTER

SEND TO: Australian Landsat Station,
PO Box 28, Belconnen, ACT,
Australia, 2616

Please amend your mailing list for future issues as follows:

NAME:
Please use block letters

ORGANISATION:

ADDRESS:
..... Postcode

PREVIOUS MAIL ADDRESS:
..... Postcode

INTEREST: GENERAL PROFESSIONAL
Please tick appropriate box

APPLICATIONS:
.....

DATE:

Landsat Products

Processed satellite images and related products are available from the Australian Landsat Station. Bulk images are available as monochrome and colour photo transparencies or photographic prints in various scale formats; and as image data on Computer Compatible Tapes (CCTs) for user manipulation. Precision images are available in the same forms with some user selected enhancements, or non-routine radiometric/geometric corrections.

Image and data catalogues are both available in microfiche form. Catalogues may be viewed at State Browse Centres, at the ALS Data Acquisition Facility (DAF), and at the ALS Data Processing Facility (DPF). Acquisition calendars, satellite coverage diagrams, and product price lists are available free on request from the Australian Landsat Station — or from the Browse Centres listed below. Orders for products can also be made through these Centres.

CANBERRA

Australian Landsat Station
22-36 Oatley Court
Belconnen ACT 2617
Phone 062-515411
Telex AA61510 LANSAT

ALICE SPRINGS

Australian Landsat Station
CSIRO Compound
Heath Road
Alice Springs NT
Phone 089-523353

SYDNEY

Map Sales
Lands Department Building
23-33 Bridge Street
Sydney NSW
Phone 02-20579

Technical & Field Surveys
250 Pacific Highway
Crows Nest NSW
Phone 02-4383700

MELBOURNE

Map Sales
Dept of Crown Lands & Surveys
25 Spring Street
Melbourne VIC.
Phone 03-6513024

Air Photographs Pty Limited
625 Burwood Road
Auburn VIC.
Phone 03-821966

HOBART

Tasmanian Government
Publications Centre
134 Macquarie Street
Hobart TAS.
Phone 002-303382

DARWIN

Survey Mapping Division
Dept Lands & Housing
Moonta House, Mitchell Street
Darwin NT
Phone 089-897572

BRISBANE

Sunmap
Aerial Photography Section
Dept of Mapping & Surveying
11th Floor, Watkins Place
288 Edwards Street
Brisbane QLD
Phone 07-2247876

ADELAIDE

Mapland
Department of Lands
12 Pirie Street
Adelaide SA
Phone 08-2272675

PERTH

Central Map Agency
Dept of Lands & Surveys
Cathedral Avenue
Perth WA
Phone 09-3231349

REFERENCE CENTRES

Department of Mapping & Surveying
Technical Planning Branch
Watkins Place
288 Edward Street
Brisbane QLD
Phone 07-2244881
Telex SURVAL AA40205

James Cook University
The Economic Geology Research Unit
C/- Geology Department
James Cook University of North Queensland
Townsville QLD 4811
Phone 077-814726
Telex UNITOWN AA47009