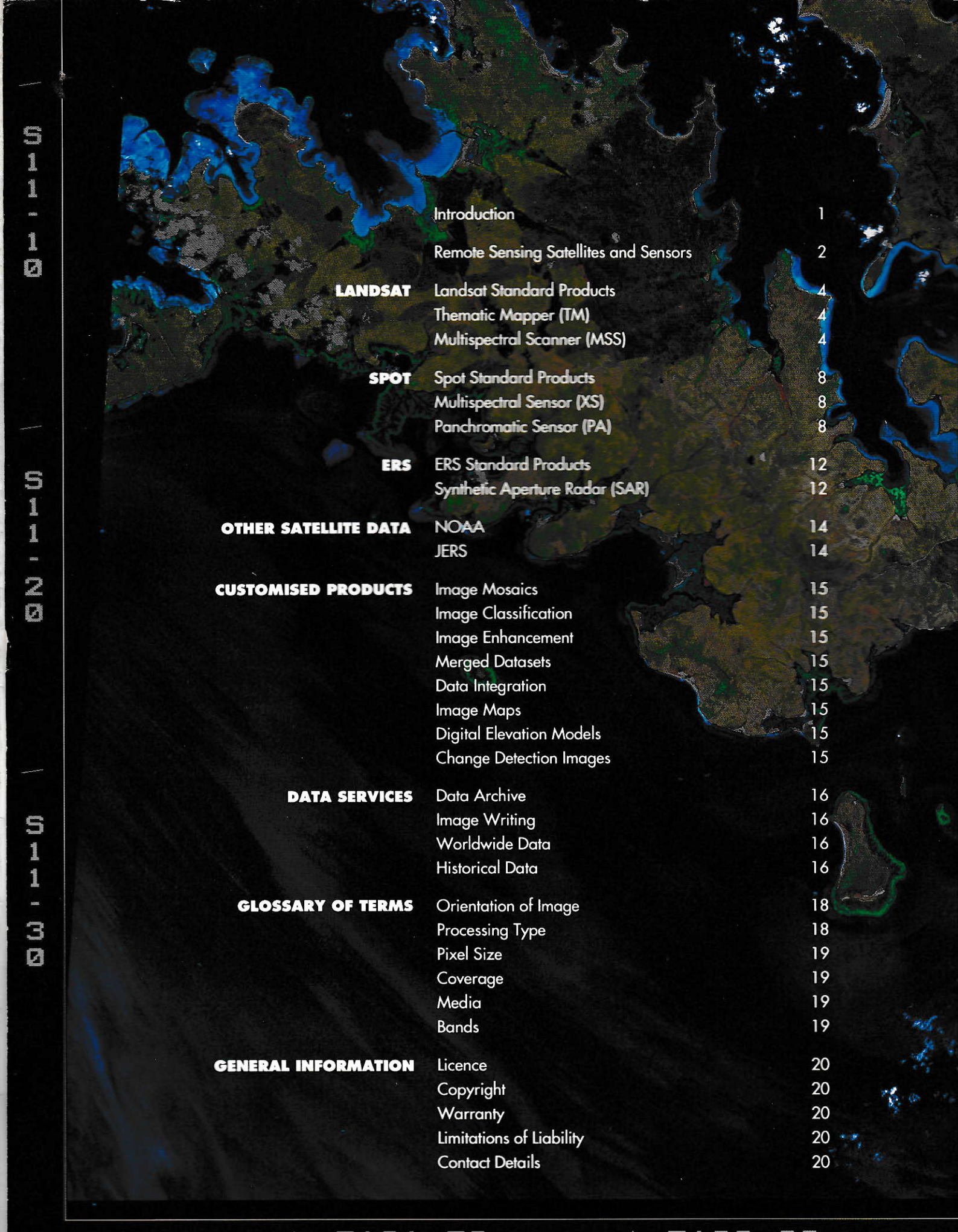

REMOTE
SENSING
PRODUCT
CATALOGUE
AUSLIG
ACRES
LANDSAT-5 TM
ORBIT: 40445



S11-10 S11-20 S11-30

E131-50 E132-00

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INTRODUCTION

Remote sensing plays a prominent role in the mapping and management of Australia's natural resources and environmental condition. Because remote sensing is the observation of an object from a distance, it is often the most practical way to gather timely and detailed information needed to explore and develop Australia.

Although remote sensing began in 1857 when a French photographer took pictures of Paris from a balloon, the technique is now the domain of aircraft and satellites. Unlike standard aerial photographs, a remotely sensed satellite image is not just a picture. Instead it is a digital, high-resolution measurement of the Earth's reflected and emitted radiation, acquired using electronic sensors.

Today, remotely sensed satellite imagery provides repetitive, wide area coverage of Australia. From hundreds of kilometres in space, satellite sensors scan the Earth, providing digital imagery which is transmitted to ground stations and processed into computer readable or photographic products for a wide range of applications—invaluable for the management of our renewable and non-renewable resources.

The Australian Surveying and Land Information Group (AUSLIG), through its Australian Centre for Remote Sensing (ACRES), operates the nation's major earth resources satellite reception and processing facility. Since 1979, ACRES satellite imagery has been provided to government and private organisations involved in the research, mapping and monitoring of Australia.

In recent years remotely sensed data has been particularly useful to people working in land management, agriculture, forestry, fisheries, mineral exploration, environmental management, urban planning and tourism.

This product catalogue introduces the comprehensive range of ACRES remotely sensed products. AUSLIG or an authorised ACRES product distributor can help you choose the product that best suits your needs. A list of current distributors is inserted at the back of this catalogue.

LANDSAT STANDARD PRODUCTS

THEMATIC MAPPER (TM)

Orientation of image	Processing type	Pixel size
Path	System or Precision	30 m
Map	System	25 m
Map	System or Precision	25 m

MULTISPECTRAL SCANNER (MSS)

Orientation of image	Processing type	Pixel size
Path	System	57 m x 80 m (approximately)
Map	System	50 m
Map	System	50 m

Notes:

- Landsat revisits the same area every 16 days.
- All Landsat full scenes are 185 km x 172 km.
- All floppy disks are IBM PC compatible and can also be read by Macintosh Floppy Drive High Density (FDHD) 1.44mb drives.
- 3.5-inch floppy disks are 1.44mb; 5.25-inch floppy disks are 1.2mb.
- Map sheets are based on the standard sheetlines of the National Topographic Map Series.
- Map-oriented products are available in other sizes. See page 18.

Coverage	Media	No. of bands
Full or quarter scenes	CCT, EXABYTE photographic print	4 or 7 1 or 3
1024 lines x 1024 pixels	3.5 or 5.25-inch floppy disk	4 or 7
Selected windows to match areas of interest or standard map sheet (1:100 000)	CCT, EXABYTE photographic print	4 or 7 1 or 3

Coverage	Media	No. of bands
Full scene	CCT, EXABYTE photographic print	4 1 or 3
512 lines x 512 pixels	3.5 or 5.25-inch floppy disk	4
Selected windows to match areas of interest or standard map sheet (1:100 000)	CCT, EXABYTE photographic print	4 1 or 3

East of Nyngan, NSW. Landsat.

SPOT STANDARD PRODUCTS

MULTISPECTRAL (XS)

Orientation of image	Processing type	Pixel size
Path	System or Precision	20 m
Map	System	12.5 m
Map	System or Precision	12.5 m

PANCHROMATIC (PA)

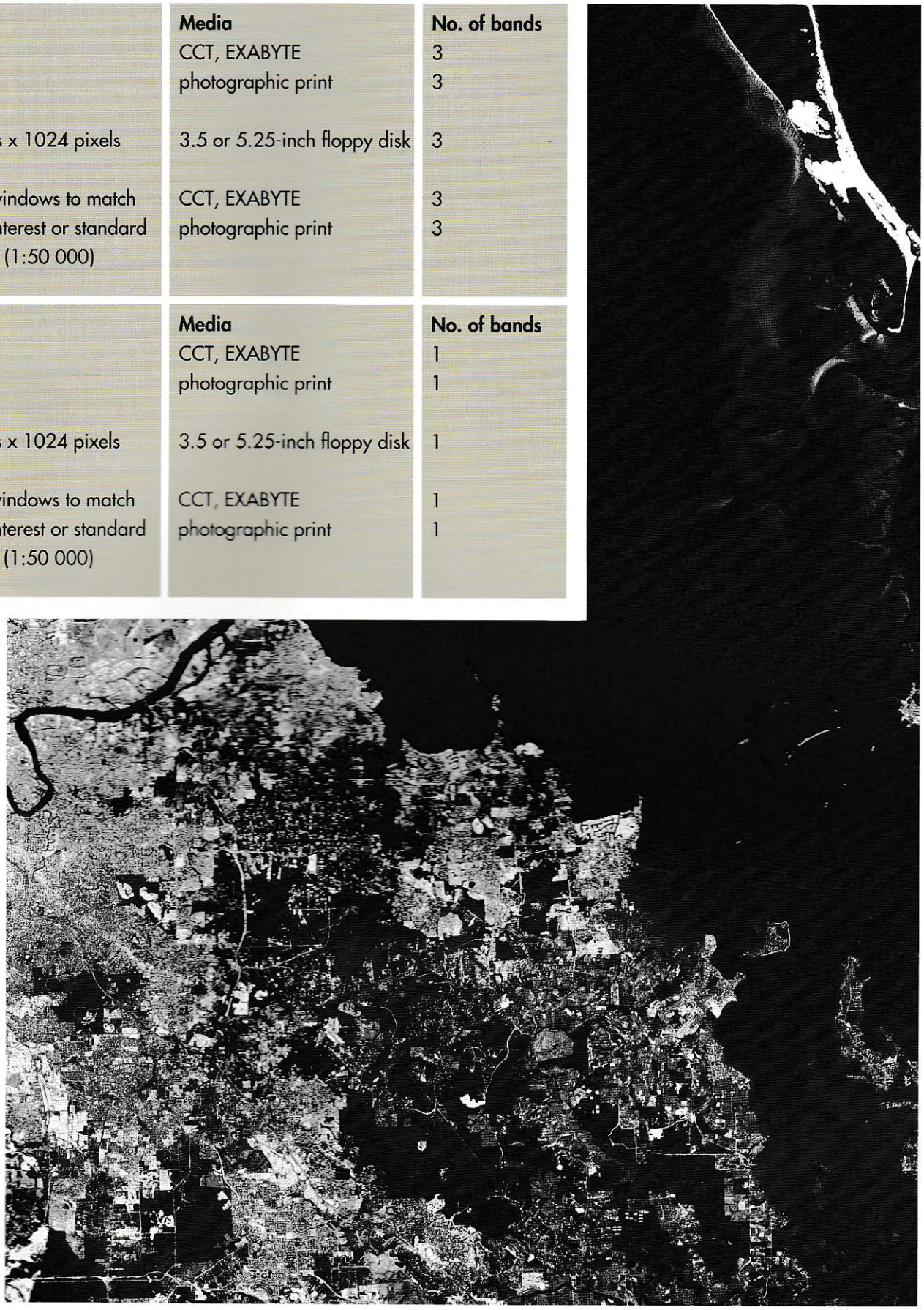
Orientation of image	Processing type	Pixel size
Path	System or Precision	10 m
Map	System	6.25 m
Map	System or Precision	6.25 m

Notes:

- SPOT revisits the same area every 26 days. Non-vertical viewing is available more frequently.
- All SPOT scenes are 60 km x 60 km at vertical viewing and 80 km x 60 km at 27° off vertical.
- All floppy disks are IBM PC compatible and can also be read by Macintosh Floppy Drive High Density (FDHD) 1.44mb drives.
- 3.5-inch floppy disks are 1.44mb; 5.25-inch floppy disks are 1.2mb.
- Map sheets are based on the standard sheetlines of the National Topographic Map Series.
- Map-oriented products are available in other sizes. See page 18.

Coverage	Media	No. of bands
Full scene	CCT, EXABYTE	3
	photographic print	3
1024 lines x 1024 pixels	3.5 or 5.25-inch floppy disk	3
Selected windows to match areas of interest or standard map sheet (1:50 000)	CCT, EXABYTE	3
	photographic print	3

Coverage	Media	No. of bands
Full scene	CCT, EXABYTE	1
	photographic print	1
1024 lines x 1024 pixels	3.5 or 5.25-inch floppy disk	1
Selected windows to match areas of interest or standard map sheet (1:50 000)	CCT, EXABYTE	1
	photographic print	1



Brisbane, QLD. SPOT.

ERS

AUSLIG acquires, processes, archives and distributes Synthetic Aperture Radar (SAR) data products from the European Earth Resources Satellite (ERS).

SAR is an active microwave sensor capable of imaging earth targets any hour of the day and regardless of cloud cover over the area.

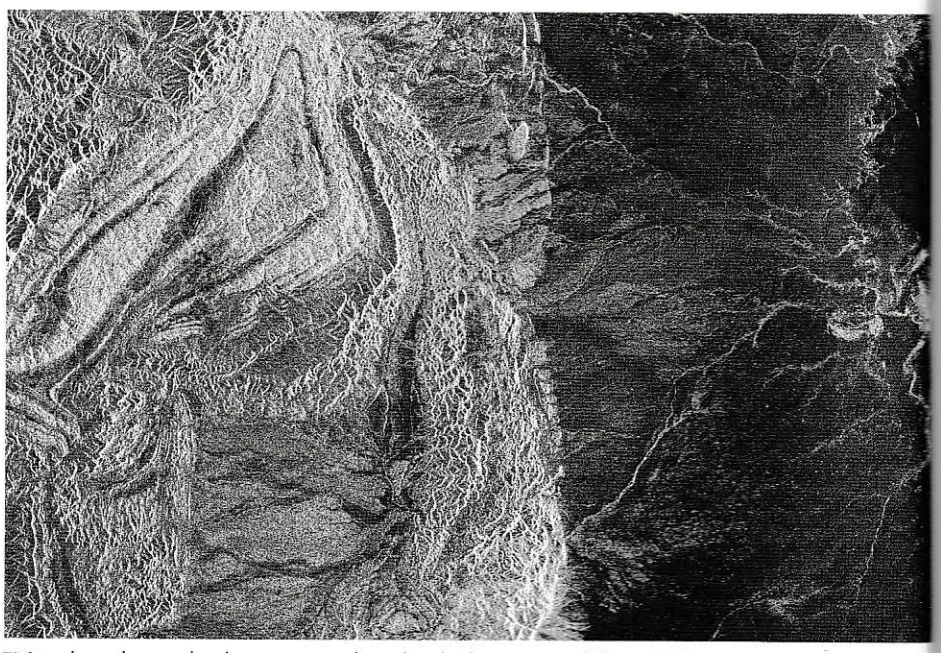
ERS was first launched in May 1991 as part of an environmental mission to gather data on the Earth's ocean, ice and land resources.

Synthetic Aperture Radar (SAR)

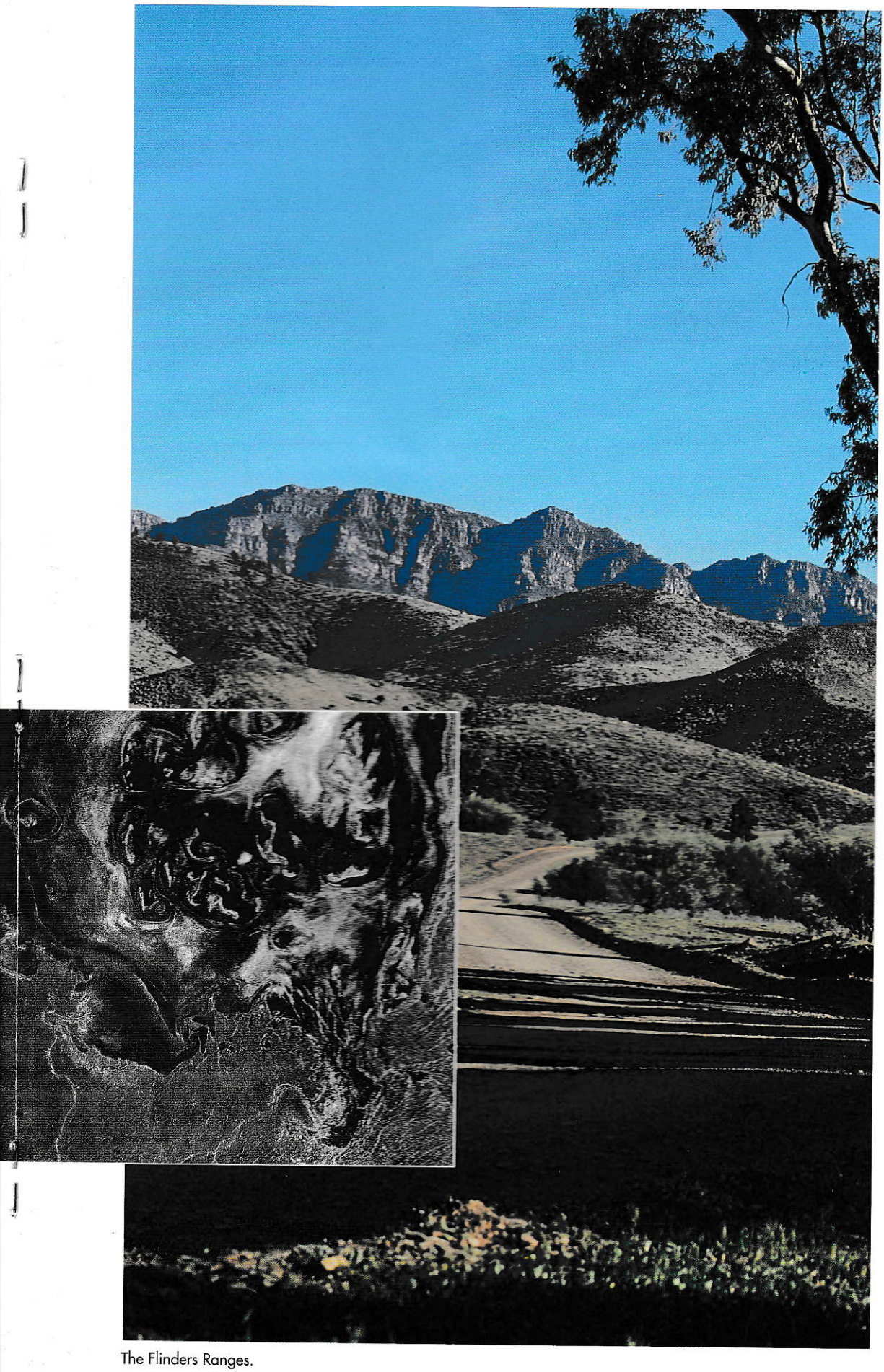
Microwave pulses are transmitted by the Synthetic Aperture Radar (SAR) antenna to the Earth's surface, which reflects all or part of the pulse back to the antenna. The strength of the pulse depends on the target's composition and orientation.

Images obtained by SAR provide information different to that obtained from optical sensors on SPOT or Landsat. SAR is particularly useful for observing oceanographic features and land features, such as vegetation cover and soil moisture. In very dry regions, subsurface features may be detected by SAR.

SAR has a 100-kilometre ground swath and 20-metre resolution.



ERS gathers data on land resources such as the Flinders Ranges (left) and Lake Frome, SA. ERS.



The Flinders Ranges.

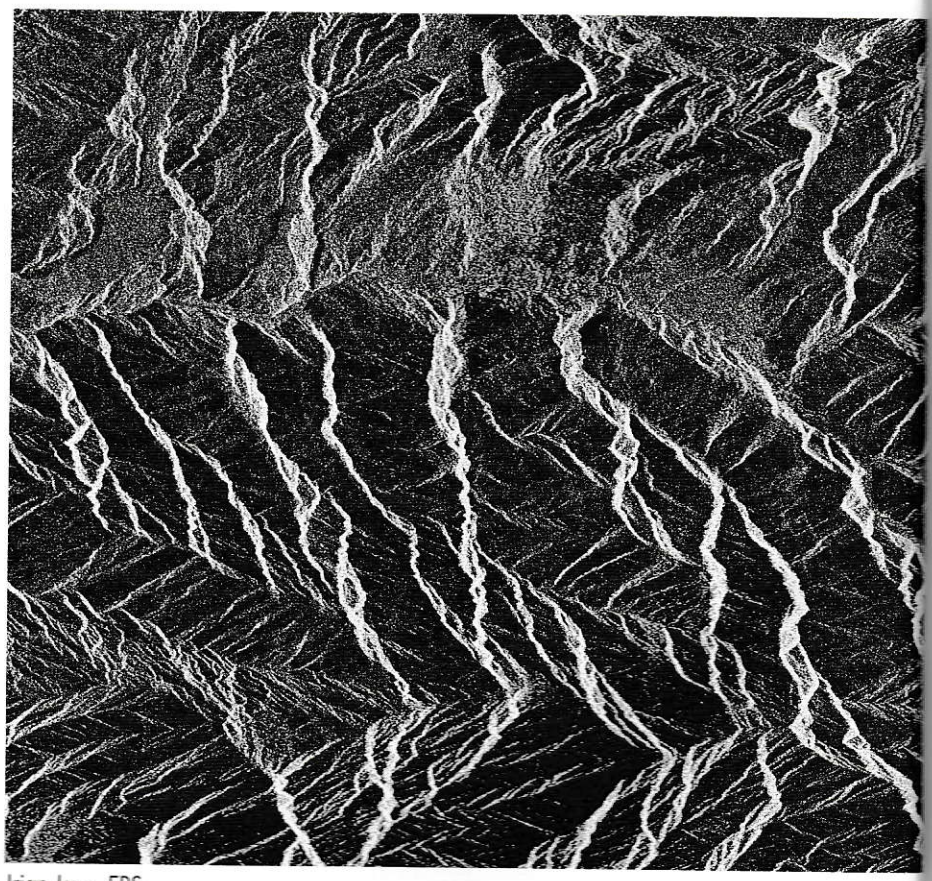
ERS STANDARD PRODUCTS

SYNTHETIC APERTURE RADAR (SAR)

Orientation of image	Processing type	Pixel size
Path	Raw (8-bit data with no corrections) System (16-bit fast delivery)	Not applicable 20 m x 16 m (approximately)

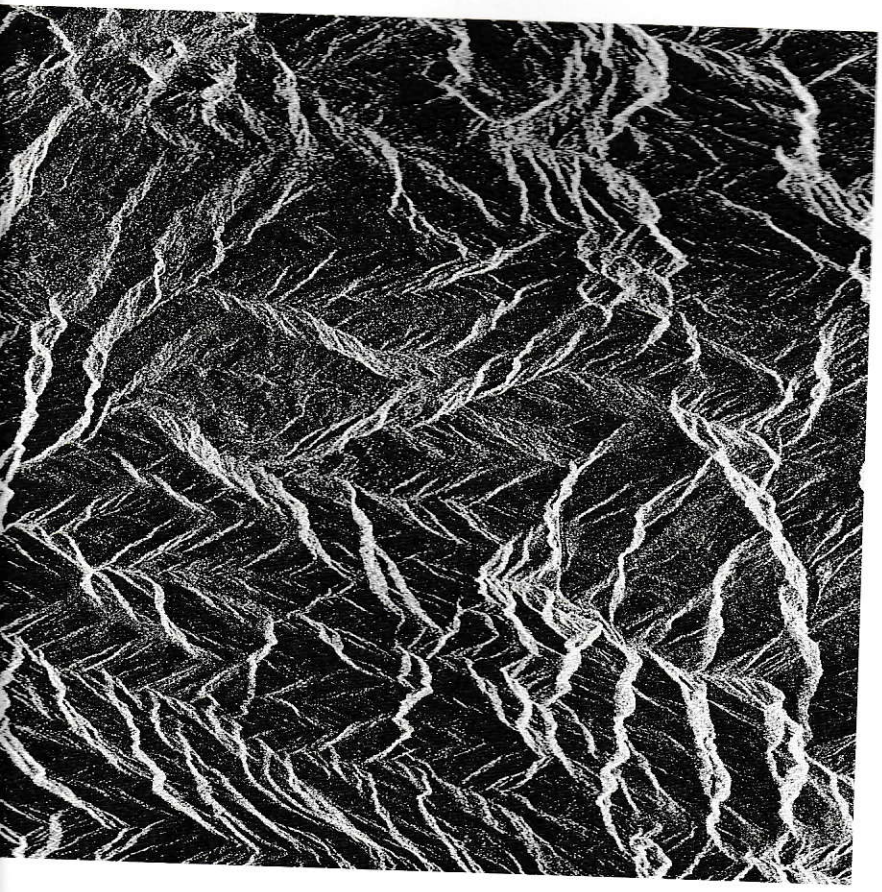
Notes:

- The ERS revisit cycle is varied according to the mission requirement. Most Australian coverage was obtained during the 35-day cycle. From April 1994 ERS will have a 168-day cycle.
- All SAR scenes are 100 km x 100 km.



Irian Jaya. ERS.

Coverage	Media	No. of bands
Full scene	CCT, EXABYTE	1
Full scene	CCT, EXABYTE	1
	photographic print	1



OTHER SATELLITE DATA

In addition to Landsat, SPOT and ERS data, AUSLIG receives data from two other satellites—NOAA and JERS. This information is available for research and other applications.

NOAA

The National Oceanic and Atmospheric Administration (NOAA) satellite launched by the United States provides daily continental coverage of Australia. Data are used by the Commonwealth Scientific Industrial Research Organisation (CSIRO) to produce a fortnightly Normalised Difference Vegetation Index for key state and national agencies which monitor major national phenomena such as drought and floods.

Its sensor, the Advanced Very High Resolution Radiometer (AVHRR), has a resolution of one kilometre and collects data in five bands in the visible, near infrared and thermal infrared wavelengths.

JERS

The Japanese Earth Resources Satellite (JERS) is a research satellite with both optical and radar sensors. JERS has a ground swath of 75 kilometres and can revisit an area every 44 days.

AUSLIG receives data from both sensors, but only processes JERS optical data. Access to JERS data has been limited to approved researchers, but this is expected to be expanded to include other users.

JERS optical sensors have a resolution of about 20 metres and collect data in the visible, near infrared and shortwave infrared parts of the electromagnetic spectrum.

Its Synthetic Aperture Radar (SAR) sensor has a resolution of 18 metres.

Satellite dish at the Data Acquisition Facility, Alice Springs.

CUSTOMISED PRODUCTS

In addition to the range of standard products, AUSLIG and its ACRES product distributors are able to customise products to the particular needs of customers. These products and their formats include:

Product		Format
IMAGE MOSAICS	Image data from different satellite passes and dates can be matched to form a single image	Digital or photographic
IMAGE CLASSIFICATION	Like features in an image can be identified to produce an image map depicting classes of features	Digital or photographic
IMAGE ENHANCEMENT	Specific features in an image can be emphasised or extracted to produce an enhanced image	Digital or photographic
MERGED DATASETS	High resolution SPOT Pan data or other digital imagery can be merged with colour-band data from SPOT or Landsat to provide full colour high resolution images	Digital or photographic
DATA INTEGRATION	Graphics and digital maps can be integrated with image data to provide specially enhanced images	Digital or photographic
IMAGE MAPS	Remotely sensed images can be enhanced to provide products with the appearance of a traditional map	Digital or photographic
DIGITAL ELEVATION MODELS	Stereo SPOT imagery can be used to produce high resolution digital elevation models (DEMs) with spot heights on a regular grid base	Digital only
CHANGE DETECTION IMAGES	Images from different dates can be processed to indicate changes in terrain features over time	Digital or photographic

DATA SERVICES

DATA ARCHIVE

In addition to this product catalogue, AUSLIG maintains a comprehensive archive of all satellite data collected at its Data Acquisition Facility in Alice Springs since 1979. The archive is recorded in three ways. These are:

- a printed listing of available scenes (with an assessment of the associated cloud cover);
- a Microimage Catalogue, distributed as colour microfiche, showing subsampled full scene imagery; and
- a Digital Quick Look Catalogue (to be released in 1994).

Each version of the catalogue is referenced according to date, satellite, path and row. They are available from AUSLIG, its ACRES product distributors or by subscription, and help customers to select data and images appropriate to their needs.

IMAGE WRITING

AUSLIG offers an image writing service for digital image data supplied on computer compatible tapes at either 1600 or 6250 bpi, and EXABYTE. Photographic images are written from either colour (3-band) or single band data.

Negatives produced by this service can be subsequently printed and enlarged by the AUSLIG photographic laboratory.

WORLDWIDE DATA

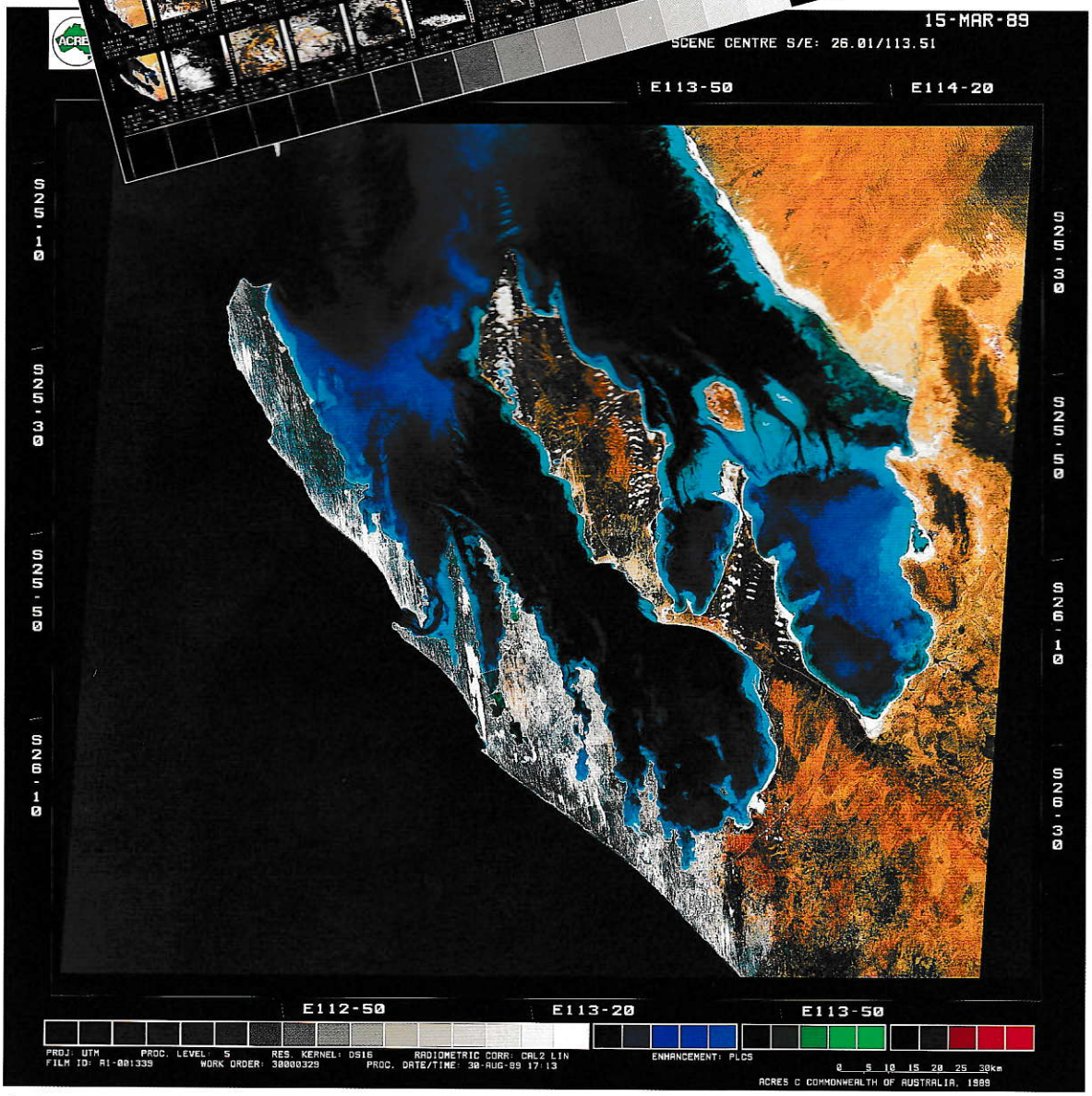
AUSLIG has arrangements with international agencies which give Australian customers access to worldwide remotely sensed imagery. Prices and availability vary from region to region. Contact AUSLIG or your local ACRES product distributor for detailed information.

HISTORICAL DATA

Remote sensing satellites have been imaging the Earth since 1972. Archived data are available as follows:

Landsat MSS	from 1980 (from 1972 through USA)
Landsat TM	from 1986
SPOT	from 1989 (from 1985 through France)
ERS	from 1991

Microimage Data Catalogue.



Shark Bay, WA. Landsat.

GLOSSARY OF TERMS

ORIENTATION OF IMAGE

There are two basic orientations for remotely sensed products. These are:

- path oriented; and
- map oriented.

Path oriented

Path oriented products are aligned to a satellite's path, which is about 10 degrees different from a north-south map grid/graticule. Although the position of the features on a path oriented image will overlay the same features on a map, the image orientation is aligned to the satellite's path.

Map oriented

Map oriented products are aligned to a map grid, with the imagery resampled and rotated. They are available as selected windows to match a customer's area of interest.

Map oriented products also come in standard map sheets tailored to match the sheetlines of the National Topographic Map Series.

PROCESSING TYPE

For most user applications, raw data must have some degree of processing. ACRES remotely sensed products are divided into two processing categories:

- system corrected; and
- precision corrected.

System corrected products

System corrected products are resampled to a map projection using a knowledge of a sensor's characteristics and positional information provided by the satellite at the time of image acquisition. In these products, the relative accuracy between any two points is equivalent to one or two pixels; however, absolute positioning is dependent on the satellite's orbit.

Precision corrected products

In terms of accuracy, precision corrected products go a step beyond system corrected products. Ground control points, generally from the National Topographic Map Series 1:100 000 scale maps, are used to position the image. Larger scale maps or ground control survey data can be used to improve the accuracy of the final product. Sub-pixel accuracy can be achieved for precision products.

Other processing

Products at other processing levels may be available. Please contact AUSLIG or its ACRES product distributors for more information.

PIXEL SIZE Spatial resolution—or the ability to discriminate between small features next to one another—is critical in determining the detail presented in satellite imagery. Pixels (picture elements) are small squares or rectangles which represent the resolution or accuracy of remotely sensed data. The smaller the pixel, the higher the degree of detail. In map-oriented products, the original data is resampled to a smaller, finer grid to allow easier integration with other map-based data.

COVERAGE Coverage refers to the area on the Earth's surface covered by a particular satellite image product.

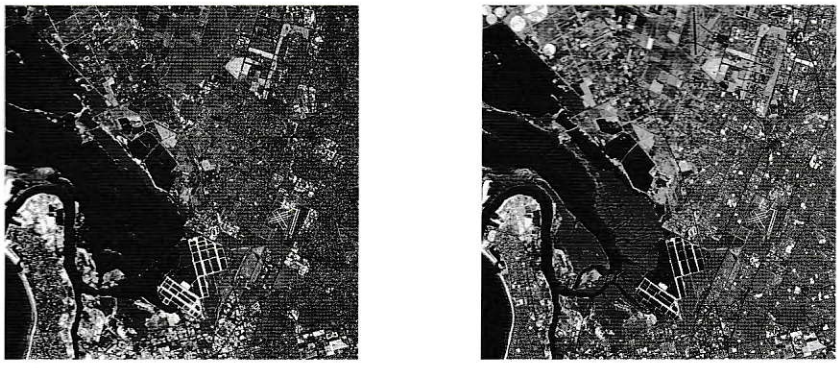
MEDIA ACRES products are available in a range of digital and photographic media formats. These include: photographic prints, photographic enlargements, computer compatible tape, PC compatible floppy disks and EXABYTE tapes.

BANDS Each satellite senses information in a specific number of bands of different wavelengths in the electromagnetic spectrum. The bands vary from sensor to sensor and cover the visible, near, middle and thermal infrared, and microwave parts of the spectrum.

Digital images can include any band combination for that sensor.

Photographic images can only use three bands to represent information. The three primary colours, blue, green and red, are used to depict all the visible as well as the invisible microwave and infrared wavelengths. The end result is a 'false colour' image with features appearing in different colours from the way we usually see them.

HOW TO CHOOSE AUSLIG or its ACRES product distributors can help you choose the image orientation, processing, coverage and band combinations appropriate to your needs.



Each band shows different information, as highlighted in these Band 1 (right) and Band 3 images of Adelaide. SPOT.

GENERAL INFORMATION

LICENCE

The Commonwealth grants to the purchaser a non-exclusive, non-transferrable licence to use, display, reproduce and adapt the data or to make derived works. License conditions are set out in the order form.

COPYRIGHT

If you wish to pass on or publish ACRES data, you should seek prior written approval. Contact the Director of Marketing, ACRES Products, AUSLIG, PO Box 28, Belconnen ACT 2616, tel 06 252 4429 and fax 06 251 6326.

WARRANTY

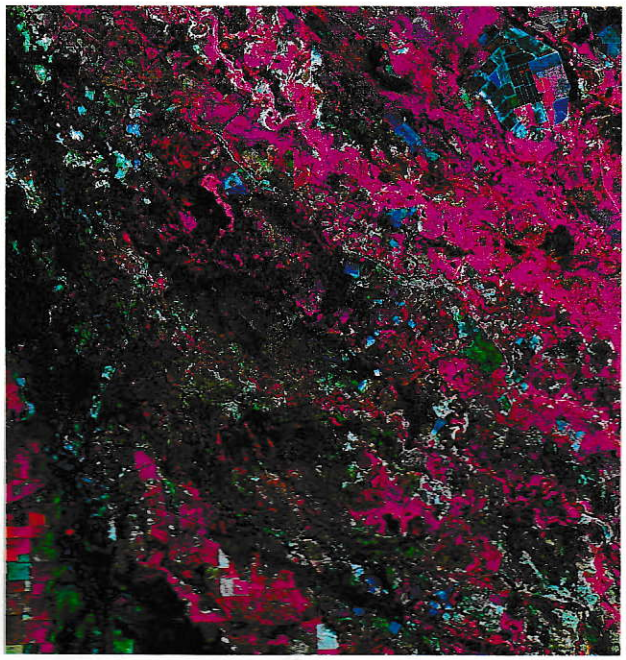
If any ACRES product is found to be defective and is returned to AUSLIG with proof of purchase within 14 days of purchase, AUSLIG may replace the data or refund the purchase price.

LIMITATIONS OF LIABILITY

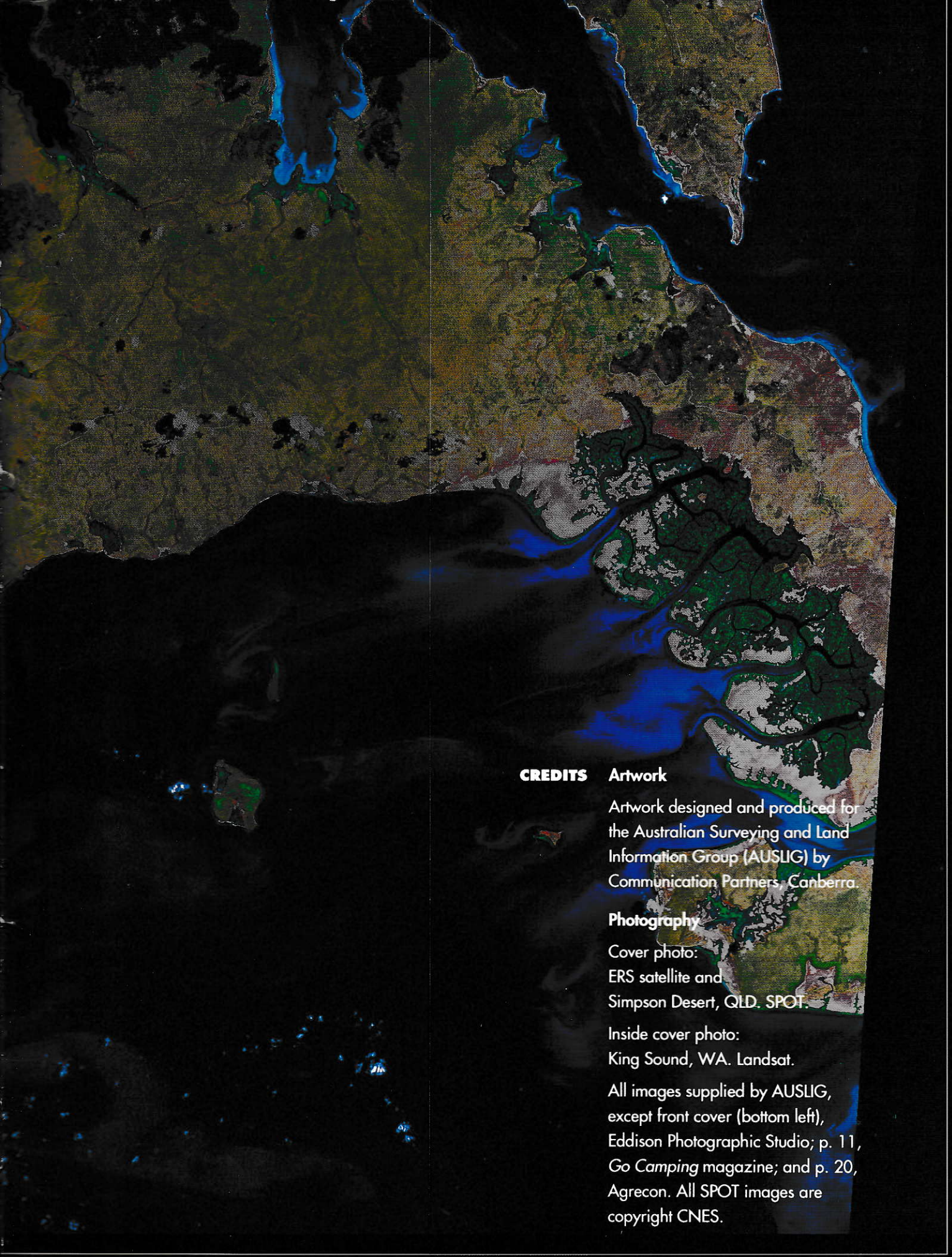
No conditions or warranties, either express or implied, are given or offered for the data except as provided by law. The Commonwealth does not warrant the suitability of the data for any purpose.
The Commonwealth shall not be in any way liable for any loss, damage or injury suffered by the licensed user of the data or any other person or organisation consequent upon or incidental to use of the data.

CONTACT DETAILS

If you want more information on ACRES products, contact:
AUSLIG, PO Box 28, Belconnen ACT 2616
Attn: Director of Marketing, ACRES Products
Tel: 06 252 4411 Fax: 06 251 6326



Nyngan Floods.
Image Writing.



CREDITS

Artwork

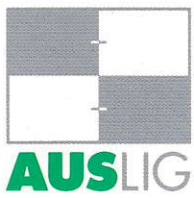
Artwork designed and produced for the Australian Surveying and Land Information Group (AUSLIG) by Communication Partners, Canberra.

Photography

Cover photo:
ERS satellite and
Simpson Desert, QLD. SPOT.

Inside cover photo:
King Sound, WA. Landsat.

All images supplied by AUSLIG, except front cover (bottom left), Eddison Photographic Studio; p. 11, *Go Camping* magazine; and p. 20, Agrecon. All SPOT images are copyright CNES.



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