

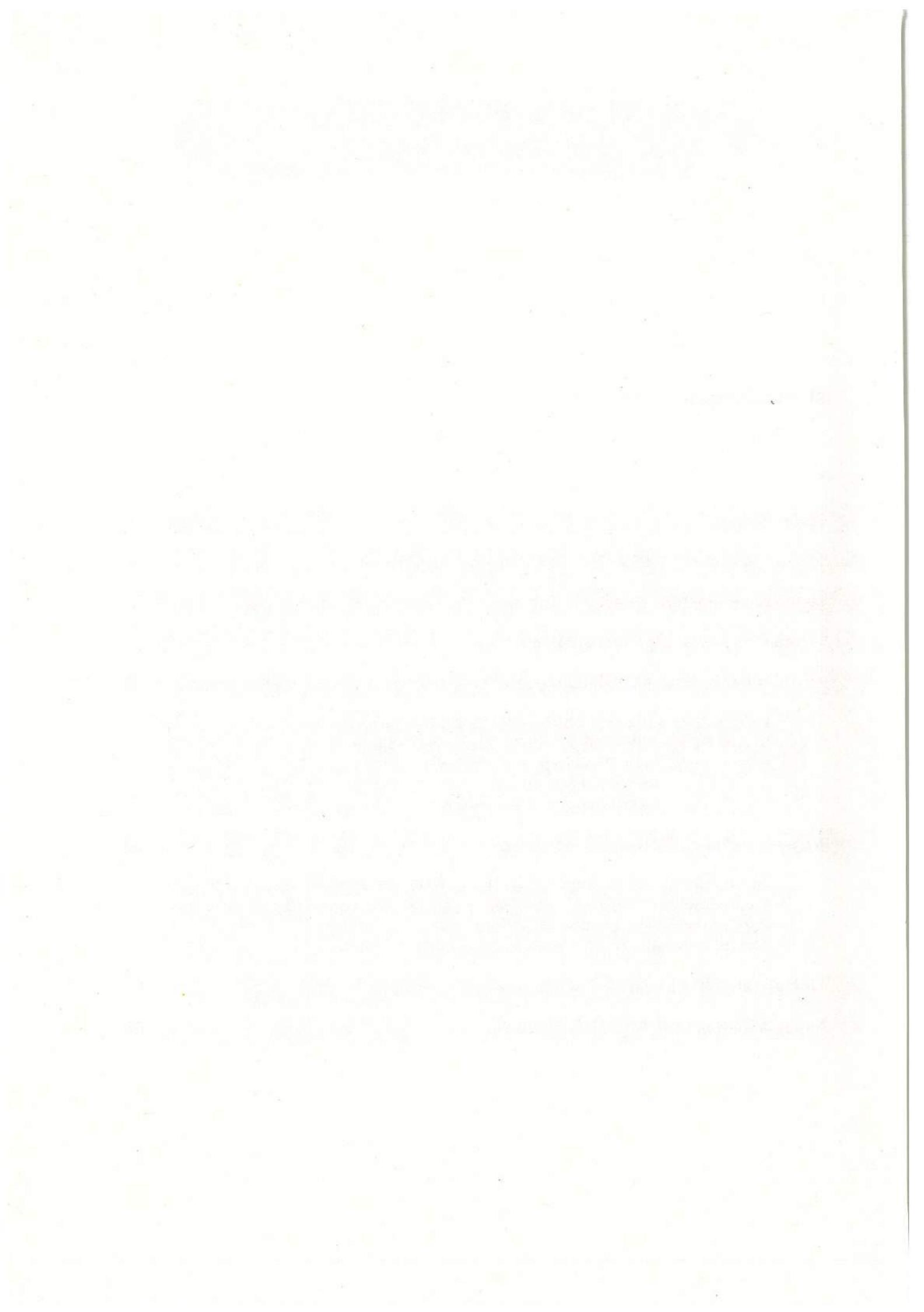
Laporan Tahunanii  
**MACRES '99**  
Annual Report



# Laporan Tahunan MACRES MACRES Annual Report 99

## Isi kandungan / Contents

	muka surat / page
Profil / Profile	1
Objektif & Strategi 1999 / 1999 Objectives & Strategies	6
Perutusan Pengarah / Director's Message	7
Sorotan Peristiwa / Highlights of Events	13
Program Penyelidikan & Pembangunan / Research & Development Programme	19
Projek Penyelidikan MACRES / MACRES Research Projects	
Projek Penyelidikan IRPA / IRPA Research Projects	
Projek Kerjasama / Collaborative Projects	
Tempatan / Local	
Antarabangsa / International	
Program Operasi / Operations Programme	33
Pembangunan Tenaga Manusia / Human Resource Development	
Pembangunan Fisikal & Kemudahan / Physical Development & Facilities	
Perkhidmatan Pengguna / User Services	
Aktiviti Antarabangsa / International Activities	
Pentadbiran & Kewangan / Administration & Finance	61
Petunjuk Prestasi / Performance Indicators	67



**PROFIL**

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**PROFILE**



## Profil / Profile

### Visi /Vision

Visi MACRES ialah untuk menjadi **peneraju** dalam bidang **remote sensing angkasa** dan teknologi-teknologi lain yang berkaitan, serta membawa negara ke arah **kecemerlangan di peringkat antarabangsa**.

MACRES' vision is to be a **leader** in the field of **space remote sensing** and related technologies and to lead the nation to **international excellence**.



Bangunan ibu pejabat baru MACRES  
MACRES new office building

### Misi / Mission

Misi MACRES ialah berusaha supaya negara mencapai **keupayaan berdikari** dan **kecemerlangan** di peringkat antarabangsa, **mengoperasikan teknologi-teknologi berkenaan** dan **menyokong industri** tempatan untuk bersaing dalam pasaran terbuka.

MACRES missions are to attain **national self-reliance** and international excellence, to **operationalise** the technologies, and to support the local industry to compete in the open market-place.



Untuk maklumat lanjut, kunjungi halaman web kami di [www.macres.gov.my](http://www.macres.gov.my)

For more information, visit our website at [www.macres.gov.my](http://www.macres.gov.my)

### Objektif / Objectives

Objektif MACRES ialah untuk **membangunkan teknologi remote sensing angkasa** dan teknologi-teknologi yang berkaitan dan **mengoperasikan penggunaanya** bagi tujuan pengurusan sumber asli dan alam sekitar, dan perancangan strategik negara.

MACRES objectives are to **develop space remote sensing** and related technologies and to **operationalise their applications** for natural resources and environmental management, and national strategic planning.

### PROGRAM UTAMA/ MAJOR PROGRAMMES

- Program Penyelidikan dan Pembangunan / Research and Development Programme
- Program Operasi / Operations Programme

## **Program / programme**

### **Program Operasi**

Program Operasi bagi tahun 1999 memberi keutamaan kepada pelaksanaan enam aktiviti berikut:

- Mengoperasi dan mengurus pusat perkhidmatan data remote sensing dan perkhidmatan lain yang disediakan oleh MACRES untuk pengguna
- Mengurus dan menyelenggara sistem perkakasan dan perisian dalaman
- Merancang dan melaksanakan program pembangunan tenaga manusia
- Merancang dan melaksana program pengkorporatan MACRES
- Mengoperasi dan mengurus stesen penerima bumi remote sensing satelit
- Mengoperasi dan mengurus pusat maklumat remote sensing nasional



### **Operations Programme**

The Operations Programme for 1999 gave priority to the following six activities implementation:

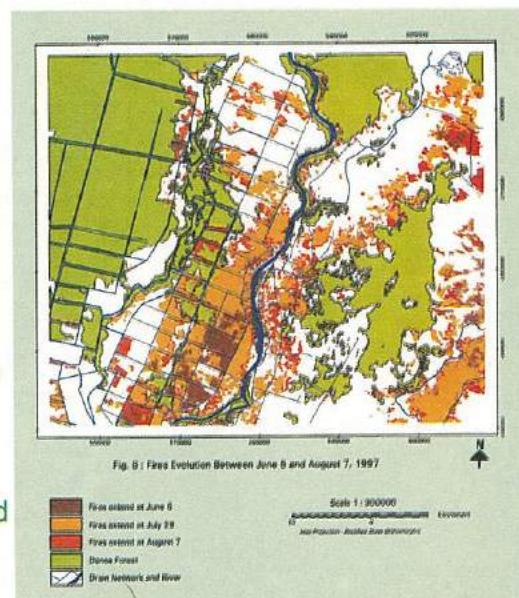
- Operate and manage user service centre for remotely sensed data and other MACRES services
- Manage and maintain in-house hardware and software systems
- Plan and implement human resource development programme
- Plan and implement MACRES corporatisation programme
- Operate and manage satellite remote sensing ground station
- Operate and manage a national remote sensing information centre

## Program Penyelidikan dan Pembangunan

- Menjalankan penyelidikan dalam bidang remote sensing angkasa dan teknologi yang berkaitan dalam semua sektor pengurusan sumber dan alam sekitar, serta perancangan strategik.
- Menjalankan penyelidikan analisa ruang dan permodelan dalam prasarana sistem maklumat geografik (GIS)
- Menjalankan penyelidikan untuk pembangunan perkakasan dan perisian bagi segmen Pengguna, segmen Bumi dan Angkasa teknologi remote sensing dan teknologi lain yang berkaitan
- Menyediakan perkhidmatan perundingan dalam aplikasi dan pembangunan remote sensing angkasa dan teknologi lain yang berkaitan

## Research and Development Programme

- Conduct research on application of space remote sensing and related technologies in all sectors of resources and environmental management, and strategic planning
- Conduct research in spatial analysis and modelling in geographic information system (GIS) environment
- Conduct research for the development of hardware and software in User, Ground and Space segments of remote sensing and related technologies
- Provide consulting and advisory services on applications and development of space remote sensing and related technologies.

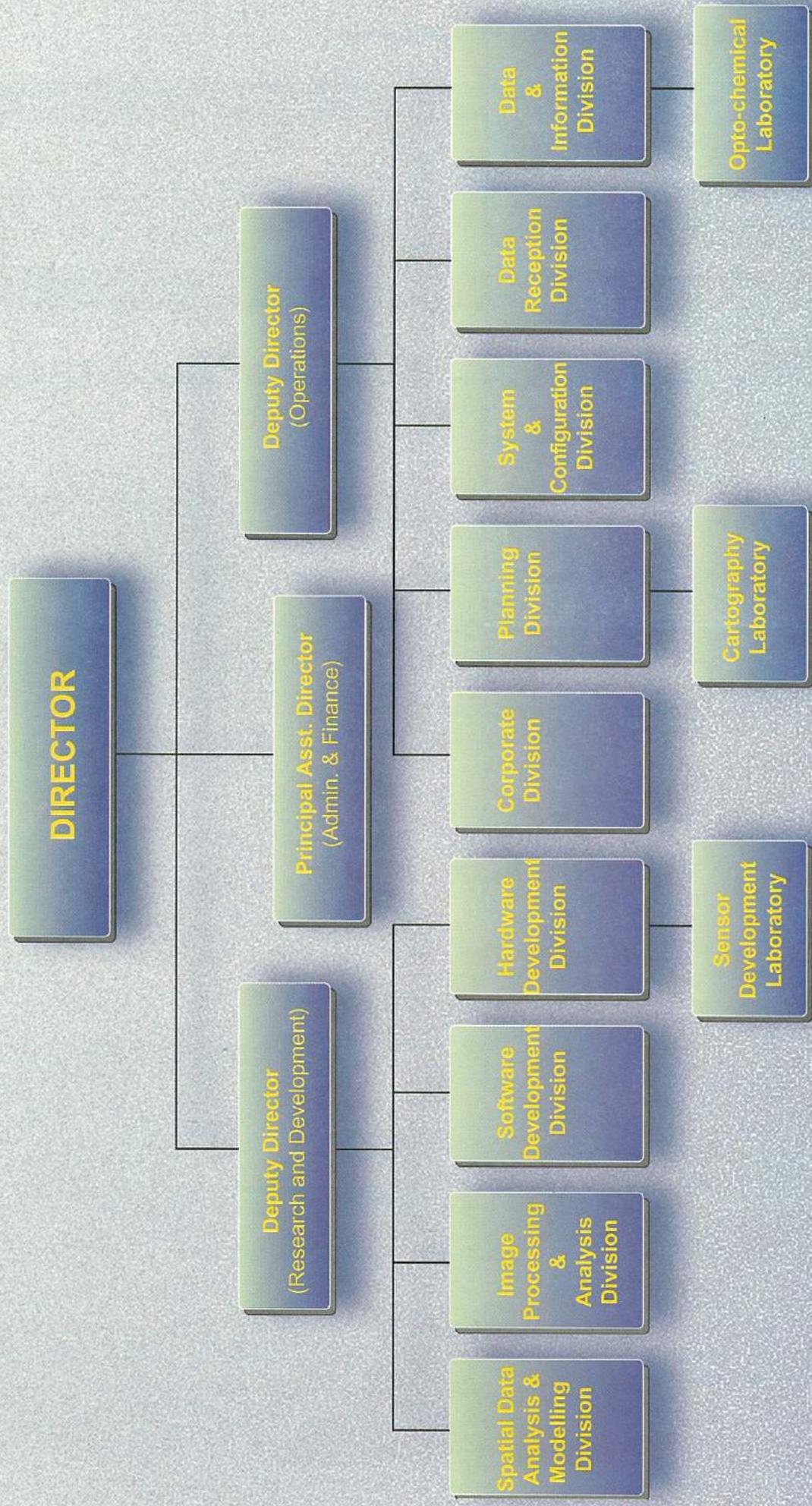


Imej satelit yang telah diklasifikasikan  
Classified satellite image



Stesen kerja untuk tugas  
penyelidikan dan pembangunan.  
Workstation for research and  
development purposes.

# Carta Organisasi Organisation chart



## Kumpulan Pengurusan MACRES MACRES Management Team



Berdiri dari kiri / Standing from left :

- Pn. Salmah Kassim - Ketua(Menanggung) Bhg. Korporat / Head(Acting), Corporate Division
- En. Jimat Bolhassan - Ketua, Bhg. Analisis & Pemodelan Data Spatial / Head, Spatial Data Analysis & Modelling
- En. Laili Nordin - Ketua II, Bhg. Analisis & Pemprosesan Imej/Head II, Image Processing & Analysis
- En. Darus Ahmad - Ketua I, Bhg. Data & Informasi / Head I, Data & Information Division
- Cik Mardiana Shafiee - Ketua, Bhg. Perancangan / Head, Planning Division
- En. Nik Nasruddin Mahmood - Pengarah MACRES / MACRES Director
- En. Loh Kok Fook - Timb. Pengarah (Menanggung) Penyelidikan & Pembangunan / Deputy Director(Acting) Research & Development
- En. Soo Soong Kwan - Ketua, Bhg. Penerimaan Data / Head, Data Reception Division
- En. Mansor Rahaman - Ketua, Bhg. Sistem & Konfigurasi / Head, System & Configuration Division
- En. Mohd. Sam Manaf - Ketua(Menanggung), Bhg. Pembangunan Perisian / Head(Acting), Software Development Division
- Pn. Nik Mazlina Nik Mustaffa - Ketua II(Menanggung), Bhg. Data & Informasi / Head II(Acting), Data & Information Division
- Cik Azmah Ali - Ketua(Menanggung), Bhg. Pembangunan Perkakasan / Head(Acting), Hardware Development Division

## Objektif / Objectives

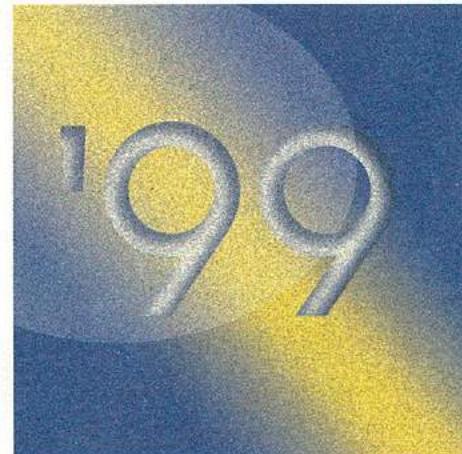
Pada tahun 1999 MACRES meneruskan tumpuan kepada pembangunan kapasiti tenaga manusia, infrastruktur dan instrumentasi, dan pelaksanaan projek-projek penyelidikan dan pembangunan serta aktiviti promosi bagi meningkat dan memperluaskan penggunaan teknologi remote sensing di Malaysia.

For 1999, MACRES continued focussing on capacity building of its human resource, infrastructure and instrumentation, and implementation of research and development projects and promotional activities to intensify applications of remote sensing technology in Malaysia.



*Pembinaan stesen bumi bagi perolehan data satelit remote sensing terkini*

*Construction of ground receiving station for real-time remote sensing satellite data acquisition*



## Strategi / Strategies

Bagi mencapai objektif tahunannya, MACRES menggunakan enam strategi, iaitu (i)membangun tenaga mahir dan terlatih; (ii)membangun infrastruktur dan memperolehi kelengkapan yang sesuai (iii) meningkatkan penyelidikan dan pembangunan; (iv) memperolehi data remote sensing satelit bagi memenuhi keperluan negara; (v) membantu dan menyokong industri tempatan untuk bersaing dalam pasaran terbuka; (vi) meningkat usahasama dengan agensi-agensi pengguna termasuk institusi pengajian tinggi.

To achieve its objectives, MACRES embarks on the following six strategies;(i)developing skilled and trained manpower; (ii)developing and acquiring appropriate infrastructure and facilities;(iii) intensifying research and development; (iv) acquiring satellite remote sensing data to meet national requirements; (v)support local industry to compete in the open market place; (vi)increase collaboration with relevant user agencies, including institutes of higher learning in development activities.

## Perutusan Pengarah / Director's Message

Tahun 1999 merupakan tahun peralihan yang paling mencabar buat MACRES. Dengan adanya kesan kegawatan ekonomi negara yang masih memberi impak kepada aktiviti pembangunan kerajaan, MACRES terpaksa mengubahsuai strategi dan perbelanjaan operasi dan pembangunan bagi mencapai objektif-objektif tahunannya dan meneruskan projek-projek pembangunan di bawah Rancangan Malaysia Ketujuhnya. Salah satu projek utama yang telah berjaya disiapkan ialah bangunan ibu pejabat baru MACRES di Jalan Tun Ismail, Kuala Lumpur dimana ianya telah diduduki pada 1 Julai 1999. Ibu-pejabat baru ini dilengkapkan dengan segala kemudahan pejabat dan stesen kerja untuk tugas penyelidikan. Bangunan baru ini mewujudkan satu persekitaran kerja yang lebih selesa dan memberangsangkan kepada kakitangan bagi meningkatkan produktiviti mereka. Dalam aspek pembangunan tenaga manusia, MACRES terus memberi peluang dan galakan supaya semua kakitangan menjalani latihan di dalam dan luar negara bagi menyediakan asas yang kukuh kepada usaha pembangunan teknologi remote sensing di negara ini.



1999 was a transition year of great challenge for MACRES. To minimise continuous impact of economic crisis on governmental development activities, MACRES adopted new strategies and expenditure for operations and development allocations so as to ensure for its annual objectives be achieved and continuation of projects under its Seventh Malaysian Plan. One project that was successfully completed was the MACRES new headquarters at Jalan Tun Ismail, Kuala Lumpur which was occupied on 1 July 1999. The new building is equipped with office facilities as well as workstations for research. The new office building provides more conducive working-environment for its staff to increase their productivity. With respect to human resource development, MACRES provided opportunities for its staff to undergo training locally and overseas in its effort to buildup strong foundation for the development and operationalisation of remote sensing in the country.

Penekanan utama MACRES terhadap penyelidikan dan pembangunan remote sensing telah banyak menyumbang kepada pengoperasian teknologi ini bagi tujuan pengurusan sumber asli dan alam sekitar, perancangan strategik dan pengurusan bencana alam dan keselamatan negara. Sebagai satu daripada langkah utama bagi meningkatkan pengoperasian teknologi ini, MACRES telah memeteraikan beberapa memorandum persefahaman dengan agensi kerajaan dan institusi pengajian tinggi untuk melaksanakan projek-projek kerjasama dalam penyelidikan dan aplikasi remote sensing. Langkah ini bertujuan menggalakkan pemindahan teknologi diantara komuniti teknologi remote sensing disamping membuka peluang bagi agensi kerajaan dan swasta berganding bahu dan berkongsi sumber untuk membina satu rangkakerja yang kukuh bagi pembangunan dan pengoperasian teknologi remote sensing angkasa di Malaysia. Tenaga pakar luar negara turut diundang untuk tujuan pemindahan teknologi dan membantu MACRES melalui projek-projek penyelidikan usahasama antarabangsa. Usaha-usaha yang telah dijalankan tersebut telah banyak meningkatkan kesedaran pengguna-pengguna menyebabkan teknologi ini semakin digunakan dengan meluas dalam berbagai sektor pembangunan negara.

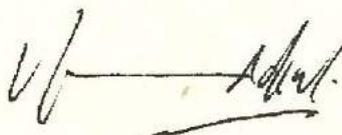
MACRES main focus towards research and development in remote sensing has significantly contributed to the operationalisation of the technology in natural resources and environmental management, strategic planning, disaster and national security management. As one of the major efforts to facilitate operationalisation of the technology, MACRES had signed a number of memorandum of understanding with government agencies and higher learning institutes to allow for joint-venture projects in remote sensing research and applications. This is aimed to encourage technology transfer amongst remote sensing technology communities as well as to provide unique opportunities for these agencies to pool their resources in the effort to build a strong framework for the development of remote sensing technology in Malaysia. Experts from overseas were also engaged to assist MACRES through international collaborative research projects. The project-impacted efforts has increased awareness of the users which lead to widespread utilisation of the technology in the various sectors of the country development.

MACRES telah diminta oleh Kabinet untuk menggunakan teknologi remote sensing bagi menjalankan pemantauan menyeluruh aktiviti-aktiviti haram di kawasan-kawasan perlindungan dan sensitif alam sekitar seperti kegiatan penerokaan dan pembalakan haram di kawasan hutan simpanan dan tadahan air. Laporan-laporan berkaitan telah disediakan bagi membantu Kerajaan dalam merangka tindakan susulan sewajarnya. Dalam usaha memenuhi kepuasan pelanggan MACRES telah menjalankan langkah-langkah bagi mendapatkan pengiktirafan ISO 9002 bagi perkhidmatan data remote sensing satelit. Usaha ini merupakan satu langkah ke hadapan untuk memberi perkhidmatan berkualiti, sistematik dan menepati waktu pesanan kepada pengguna. Selaras dengan dasar kerajaan yang menekankan kepada pengumpulan dan penyebaran maklumat menerusi *internet*, MACRES telah membangunkan laman webnya yang diusahakan oleh sekumpulan pegawai teknologi maklumat dalaman.

Akhir kata, saya berharap MACRES akan sentiasa dapat memberi sokongan padu dan terus memainkan peranan yang aktif dan berkesan bagi mencapai visinya untuk menjadi peneraju dalam bidang teknologi remote sensing angkasa di Malaysia.

MACRES was requested by the Cabinet to make full use of remote sensing technology in monitoring illegal activities such as illegal logging and encroachment in protective and environmental sensitive areas, forest reserves and water catchment areas. Reports were submitted to assist the Government in formulating appropriate actions. In an effort to increase users satisfaction, MACRES has initiated an effort for ISO 9000 certification for remote sensing data services. This is another step towards delivering a more quality, systematic and timely data service for its users. In line with the governments policy to encourage use of internet for disseminating information, MACRES had put into service its homepage developed by of a group of in-house information technology personnel.

Lastly, I hope MACRES would continue to give full support and will always play an active role in making MACRES the leader in space remote sensing technology in Malaysia.



NIK NASRUDDIN MAHMOOD, FRSS  
Pengarah MACRES  
Director MACRES

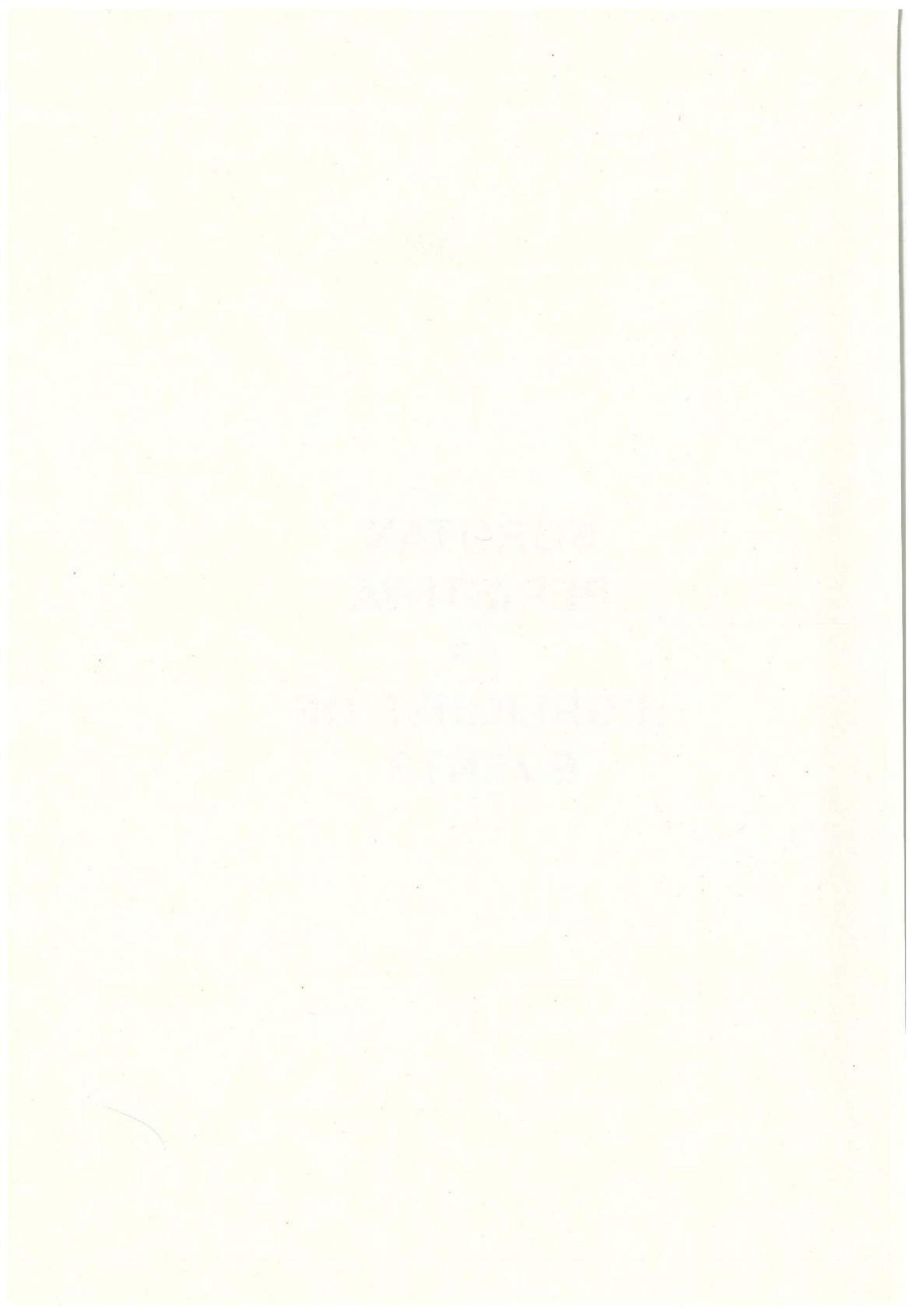


## **SOROTAN PERISTIWA**

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## **HIGHLIGHTS OF EVENTS**



## Sorotan Peristiwa / Highlights of Events



Bangunan ibu-pejabat baru MACRES yang telah siap dibina pada Jun 1999.

MACRES new headquarters which was completed in June 1999



Suasana pemindahan dari ibu pejabat sementara MACRES (City Square Centre) ke bangunan baru di Jalan Tun Ismail pada 1 Julai 1999

Shifting of MACRES temporary headquarters (City Square Centre) to the new building at Jalan Tun Ismail on 1 July 1999



Lawatan Y.B. Menteri Sains, Teknologi & Alam Sekitar ke bangunan ibu pejabat baru MACRES pada 12 Julai 1999.

The Honourable Y.B. Minister of Science, Technology & the Environment visit to MACRES new headquarters on 12t July 1999.

## Sorotan Peristiwa / Highlights of Events



Peserta Bengkel Landslide Hazard Zonation Using Remote Sensing & GIS, yang diadakan di Hotel Crown Princess, Kuala Lumpur pada 14-25 Jun 1999

Participants of Workshop on Landslide Hazard Zonation Using Remote Sensing & GIS, held at Crown Princess Hotel, Kuala Lumpur on 14-25 June 1999



Majlis menandatangan MOU antara MACRES dan Jabatan Pengairan dan Saliran di Kuching, Sarawak pada 27 November 1999

The signing ceremony of MOU between MACRES and Department of Drainage and Irrigation in Kuching, Sarawak on 27 November 1999



Lawatan pakar-pakar marin Vietnam ke MACRES pada 2 Mac 1999

Visit of marine experts of Vietnam to MACRES on 2 March 1999



Seminar Dissemination of New Remote Sensing Methodology Through a Semi-expert System seminar anjuran MACRES, JOFCA dan ITTO di Kuala Lumpur pada 7-8 Jun 1999

Dissemination of New Remote Sensing Methodology Through a Semi-expert System Seminar organised by MACRES, JOFCA and ITTO in Kuala Lumpur on 7-8 June 1999

## Sorotan Peristiwa / Highlights of Events

*Sambutan Hari Keluarga MACRES 1999 pada 2 Oktober 1999*

*MACRES 1999 Family Day celebration on 2 October 1999*



*Mesyuarat Agung Kelab MACRES ke-3 yang diadakan pada 22 Februari 1999*

*Kelab MACRES 3rd Annual General Meeting held on 22 February 1999*



*Kakitangan MACRES yang berjaya menerima Anugerah Khidmat Cemerlang tahun 1998 pada 23 Ogos 1999*

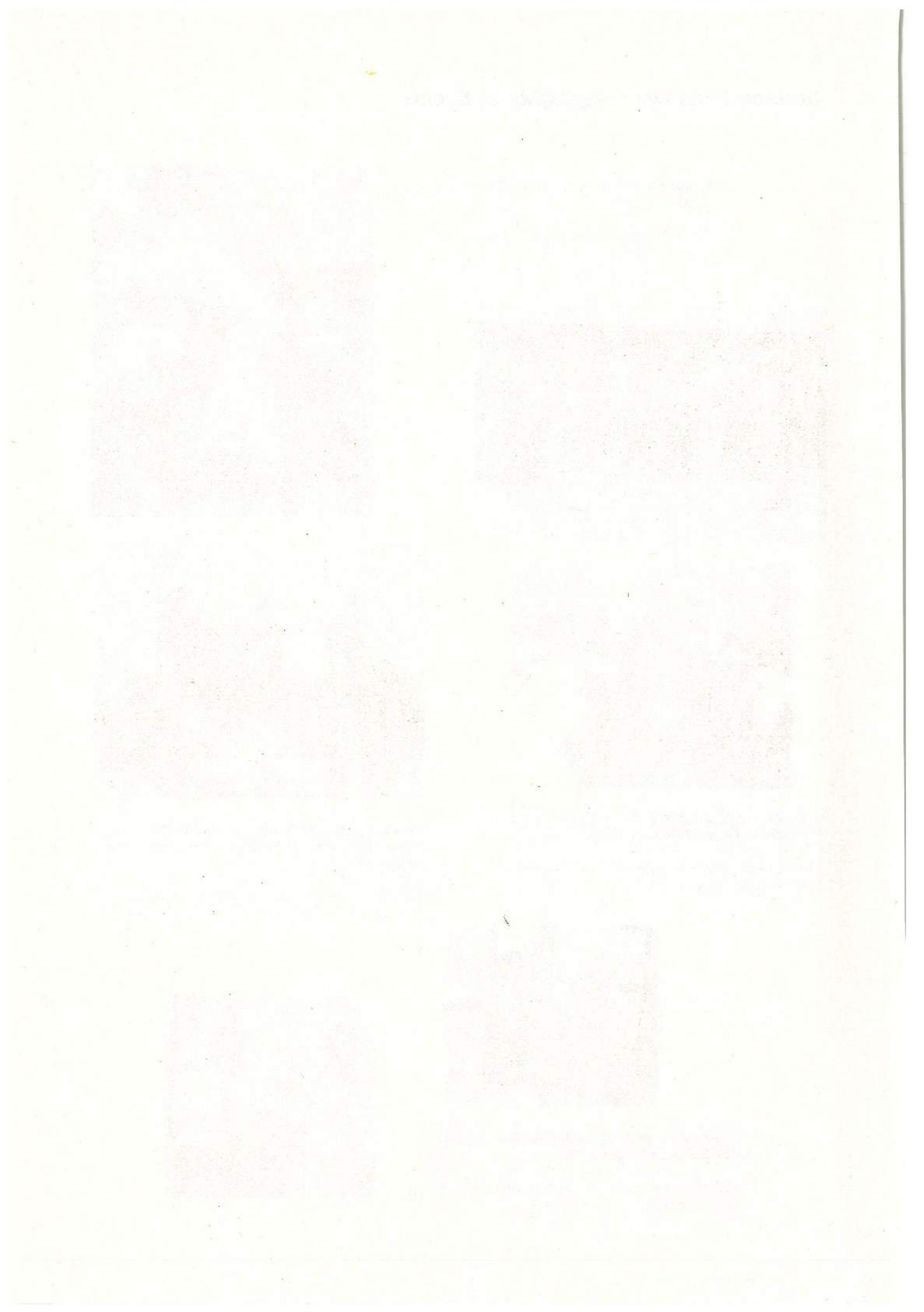
*MACRES staff who received the 1999 Anugerah Khidmat Cemerlang award on 23 August 1999*



*Majlis perpisahan bagi dua kakitangan pioneer MACRES pada 5 Ogos 1999*

*Farewell gathering for two MACRES pioneer staff on 5 August 1999*





**PROGRAM  
PENYELIDIKAN &  
PEMBANGUNAN**

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**RESEARCH &  
DEVELOPMENT  
PROGRAMME**

1860  
Montgomery

## **Program Penyelidikan & Pembangunan Research & Development Programme**

Pada tahun 1999, MACRES meneruskan pelaksanaan tiga program P&P, iaitu projek penyelidikan MACRES, penyelidikan IRPA dan penyelidikan kerjasama/dua-hala tempatan dan antarabangsa.

In 1999, MACRES continued implementing three R&D programmes, i.e. MACRES development projects, IRPA research projects and collaborative projects with local and foreign partners.

### **Projek P&P MACRES/MACRES R&D Projects**

#### **Program Pengurusan Sumber dan Alam Sekitar Nasional(NAREM)**

Dalam tahun 1999 NAREM membangunkan kemasukan input datameta, direktori data dan 'Rekabentuk Pangkalan Model' (*Model Base Design*). Data *baseline* untuk pertanian, perhutanan, geologi, perairan dan aplikasi sosio-ekonomi telah juga diwujudkan. Pakej-pakej aplikasi telah

dibentuk untuk perancangan guna tanah pertanian bersepadu, membuat indeks kepekaan pencemaran tumpahan minyak di zon pantai, penilaian risiko hakisan tanah dan pemetaan kawasan potensi air bawah tanah. Dua pakar dari China membantu dalam pembangunan rekabentuk pangkalan model dan penyediaan program antara muka (*interface*).

*Objektif projek NAREM adalah untuk mewujud dan mengoperasikan satu sistem pangkalan data spatial bersepadu untuk sumber asli dan alam sekitar untuk menyokong perancangan pembangunan negara.*

*The NAREM project has the objective to establish and operationalise an integrated system of spatial database on national resources and the environment to support national development planning*



Seminar Projek IRPA MACRES Kedua yang berlangsung pada 21 Disember 1999  
The Second MACRES IRPA Projects Seminar held on 21 December 1999

#### **National Resources and Environmental Management Programme (NAREM)**

In 1999 NAREM developed its metadata input entry, data directory and model base design. The baseline data for agriculture, forestry, geology, coastal zone and socio-economic application was also established. Application packages were developed for integrated agriculture land use planning, sensitivity indexing against oil spill pollution in coastal zone, soil erosion risk assessment and groundwater potential mapping using appropriate models. Two experts from China assisted in the model-based design development and preparation of interface programme.

Dengan kerjasama Unit Perancang Ekonomi (EPU), Jabatan Perdana Menteri, Seminar NAREM Kedua telah dianjurkan pada 30 Mac 1999 di INTAN. 120 peserta dari 56 agensi pengguna (jabatan-jabatan sumber, institusi-institusi penyelidikan dan universiti-universiti) telah menghadiri seminar tersebut. Satu seminar berkenaan '*Precision Agriculture*' telah dianjurkan bersama dengan University of Sydney, Australia pada 20-21 Julai 1999, di Kuala Lumpur. MACRES juga menganjurkan seminar '*Rice Monitoring using SAR Data*' bersama CNES, Perancis pada 15-16 November 1999, di Kuala Lumpur. Kedua-dua seminar ini memberi sumbangan yang bermakna kepada pemindahan teknologi untuk pelaksanaan projek-projek NAREM. MACRES turut melaksanakan beberapa projek bersama agensi pengguna berkaitan untuk pembangunan aplikasi di bawah NAREM. Ini termasuklah :

- Pengesahan perubahan garisan pantai
- Ramalan banjir dan pengurusan lembangan sungai
- Pengurusan hutan
- Pemetaan potensi akuakultur, ramalan potensi Ikan dan Pengurusan Taman Laut
- Ketepatan Perladangan Kelapa Sawit



Peserta Seminar NAREM Kedua pada 30 Mac 1999 sedang mendaftar  
Registration of participants of the Second NAREM Seminar held on 30 March 1999

In collaboration with the Economic Planning Unit (EPU) of the Prime Minister's Department, the Second NAREM National Seminar was organised on 30 March 1999 at INTAN. 120 participants from 56 user agencies (resource departments, research institutions and universities) attended the seminar. On 20-21 July 1999 a seminar on Precision Agriculture was organised jointly with the University of Sydney, Australia, in Kuala Lumpur. MACRES also organised the Rice Monitoring Using SAR Data Seminar with CNES, France on 15 - 16 November 1999 in Kuala Lumpur. These two seminars contributed significantly to technology transfer in the precision agriculture and rice monitoring projects of NAREM. MACRES initiated several joint projects with relevant user agencies for the application development under NAREM. These include:

- Coastline change detection
- Flood forecasting and river basin management
- Forest management
- Aquaculture potential mapping, fish potential forecasting and marine parkmanagement
- Precision oil palm cultivation.



Seminar '*Precision Agriculture*' pada 20 -21 Julai di Hotel Pan Pacific, Kuala Lumpur  
Seminar on Precision Agriculture on 20 -21 July, at Pan Pacific Hotel, Kuala Lumpur

## Pemantauan Kawasan Sensitif Alam Sekitar

Pada 6 Januari 1999, Jemaah Menteri telah meminta MACRES melapor secara berterusan mengenai status kawasan-kawasan perlindungan sensitif alam sekitar menggunakan teknologi remote sensing dan teknologi yang berkaitan. Objektif utama arahan tersebut adalah untuk memastikan kawasan-kawasan sensitif alam sekitar seperti kawasan tадahan air, kawasan simpan hutan liar, taman nasional, hutan simpanan, hutan paya gambut dan hutan bakau dilindungi daripada aktiviti-aktiviti negatif seperti pembalakan dan penerokaan haram. Kawasan-kawasan sensitif alam sekitar adalah khazanah negara yang kaya dengan pelbagai biologi. Rajah 1 menunjukkan kawasan tадahan Tasek Bera yang merupakan tasik air tawar yang terbesar di Semenanjung Malaysia dan seperti kawasan paya yang lain, ia memainkan peranan penting bagi kawalan banjir, kawalan pengaliran air dan penapisan kekotoran serta membekalkan sumber-sumber semulajadi kepada penduduk tempatan. Tasek Bera telah diiktiraf sebagai kawasan RAMSAR yang pertama di Malaysia oleh *International Wetlands Convention*. Nota-nota Kabinet telah disediakan dengan input daripada agensi-agensi yang berkaitan bagi pengesahan maklumat yang diperolehi daripada remote sensing.

## Monitoring of Environmental Sensitive Areas

On 6 January 1999, MACRES was requested to submit to the Cabinet regular reports on the status of environmental sensitive areas using remote sensing and related technologies. The main objective of the directive is to ensure that these environmental sensitive areas such as water catchment, wildlife reserves, national parks, forest reserves, peat swamp forests and mangrove forests are being protected from unwarranted activities such as illegal logging and development encroachment around and within them. These areas are also part of our national heritage that need to be conserved and managed in sustainable ways to preserve their ecological functions and their rich bio-diversities. Figure 1 shows Tasek Bera catchment area, which is the largest natural freshwater lake in Peninsular Malaysia and like many other wetlands, plays an important role in flood control, water flow regulation and purification, and provides many natural resources to the local community. Tasek Bera has been recognised as the Malaysia's first RAMSAR site by the International Wetlands Covention. Reports to the Cabinet was prepared in collaboration with relevant government agencies which provide inputs required for verification of information obtained from satellite remote sensing data.



Pada tahun 1999 sebanyak 12 nota telah dikemukakan ke Kabinet yang meliputi topik-topik berikut:

- Kawasan Tadahan Temengor/Belum
- Kawasan Tadahan Tasek Bera
- Pembangunan Tanah Di sekitar Taman Negara
- Kawasan Hutan Di Sekitar MSC
- Kawasan Tadahan Tasek Kenyir
- Hutan Bakau Di sekitar Port Klang
- Hutan Paya Gambut Di sekitar Daerah Pekan dan Rompin, Pahang
- Penggunaan Tanah Di sekitar Bukit Pelandok, Negeri Sembilan
- Aktiviti Pembalakan/Pembangunan Di sekitar Tanah Tinggi Lojing
- Pembangunan Persisiran Pantai di Melaka
- Penukaran Kawasan Padi ke Kegunaan Tanah Lain Di sekitar Alor Setar
- Pengesanan dan Pemantauan Kebakaran Hutan Menggunakan Data Satelit SPOT Berresolusi Tinggi



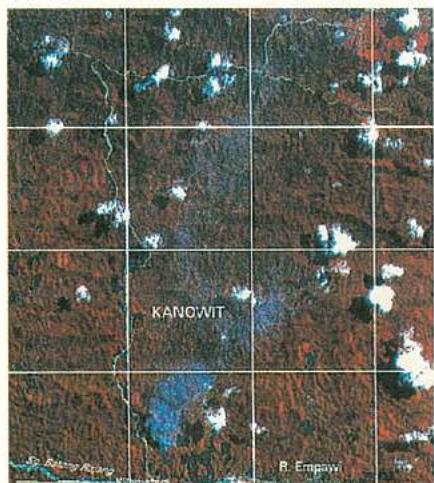
*Kawasan tadahan air Tasek Bera  
Tasek Bera catchment area*

In 1999, a total of 12 reports were submitted to the Cabinet covering the following topics:

- Temengor/Belum Catchment Areas
- Tasek Bera Catchment Areas
- Land Development Around Taman Negara
- Forested Land Around MSC Area
- Tasek Kenyir Catchment Areas
- Mangrove Forest Around Port Klang
- Peat Swamp Forest Around Pekan and Rompin District, Pahang
- Land Use Around Bukit Pelandok, Negeri Sembilan
- Logging/Land Development Activities in Highland Areas Around Lojing
- Coastal Land Development In Melaka
- Coservation of Paddy Fields to Other Land Uses Around Alor Setar
- Detection and Monitoring of Forest Fires Using High Resolution SPOT Satellite Data

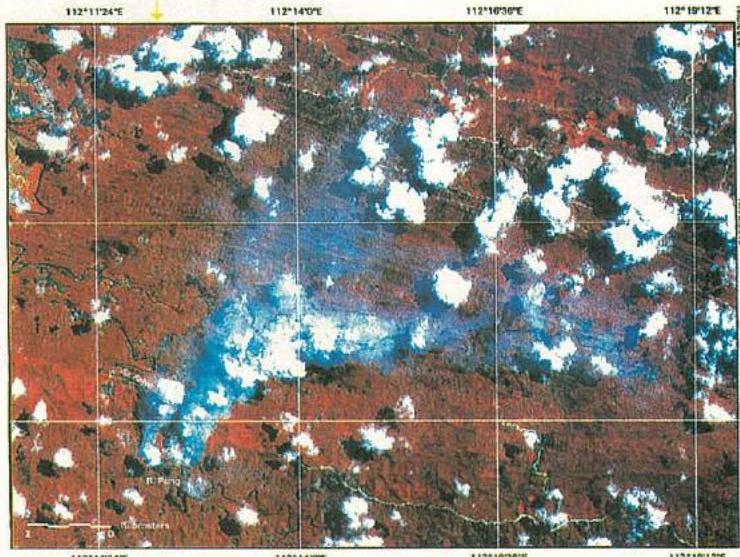
## Kebakaran Hutan-Pengesanan dan Pemantauan

Komponen pengesanan dan pemantauan di bawah Pelan Pengurusan Kebakaran Hutan yang di rumuskan oleh MACRES semasa episod jerebu 1997/1998 diteruskan perlaksanaannya ditahun 1999. Imej-imej kebakaran hutan dan pembakaran terbuka yang dikesan oleh satelit SPOT di Malaysia dan Indonesia telah diproses dan dimajukan kepada pihak berkuasa di Malaysia dan juga di luar negara melalui siri mesyuarat *Sub-Regional Fire Fighting Arrangements(SRFA)* bagi Sumatra, yang dipengerusikan oleh Ketua Pengarah Jabatan Alam Sekitar Malaysia. SRFA akan melapor kepada *ASEAN Senior Officials on Environment (ASOEN) Haze Technical Task Force (HTTF)* yang kemudiannya melapor kepada *ASEAN Ministerial Meeting on Haze (AMMH)*. AMMH memastikan Pelan Bertindak Serantau Jerebu berjaya dilaksanakan. Rajah-rajab menunjukkan kebakaran hutan yang dikesan oleh satelit SPOT pada 29 Julai 1999 di sekitar Kanowit dan Sg. Pakoh, Bahagian Ketiga, Sarawak.



Kebakaran hutan yang dikesan melalui satelit SPOT pada 29 Julai 1999 di kawasan Kanowit dan Sg. Pakoh, Sarawak

Forest fires detected by SPOT satellite on 29 July 1999 around Kanowit and Sg. Pakoh area.



## Forest Fire-Detection and Monitoring

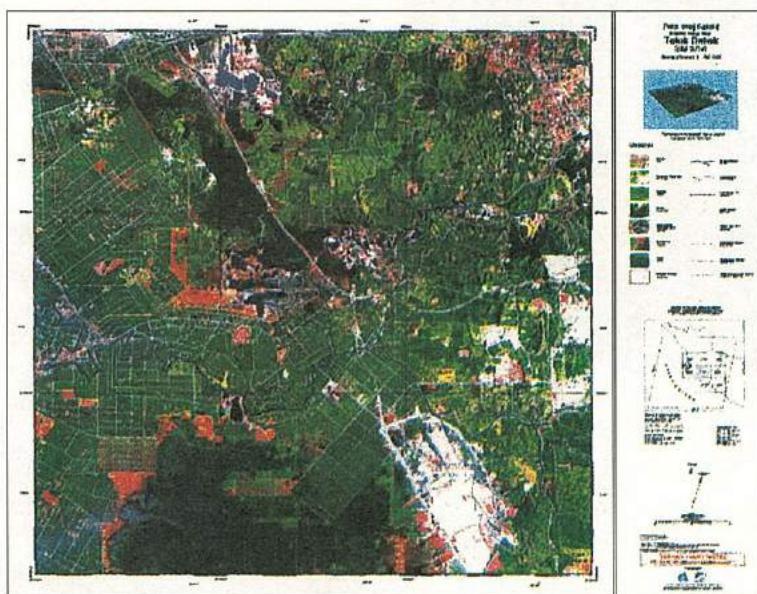
The component on Detection and Monitoring of the Total Forest Fire Management Plan formulated by MACRES during the haze episode of 1997/1998 continued to be implemented in 1999. Forest fires scenes acquired by high resolution SPOT satellite images within Malaysia and Indonesia were processed and disseminated to relevant authorities within Malaysia for actions and outside the country via a series of meetings of the Sub-Regional Fire Fighting Arrangements (SRFA) for Sumatra, which is chaired by the Director General of the Department of Environment, Malaysia. The SFRA will report to the ASEAN Senior Officials on Environment (ASOEN) Haze Technical Task Force (HTTF) which subsequently submit reports to the ASEAN Ministerial Meeting on Haze (AMMH). The AMMH ensures that the Regional Haze Action Plan (RHAP) that addressses Transboundary Pollution including smoke haze from forest fires be implemented successfully. Figures show forest fires detected by SPOT satellite on the 29 July 1999 around Kanowit and Sg. Pakoh areas in the 3rd Division, Sarawak.

## Peta Imej Satelit(SIM)

Projek Peta Imej Satelit(SIM) dijalankan bagi menyediakan peta topografi berdasarkan kepada imej remote sensing dan data vektor terpilih seperti jalan raya, kontor sungai dan sempadan pentadbiran. Pangkalan data yang dihasilkan dari projek SIM ini menjadi sebagai data asas kepada pangkalan data projek NAREM yang dilaksanakan oleh MACRES. Bagi melicinkan pelaksanaan projek SIM yang memerlukan banyak data vektor, MACRES menjalankan projek ini dengan kerjasama Jabatan Ukur dan Pemetaan Malaysia (JUPEM). Dalam tahun 1999 pangkalan data vektor yang terdiri daripada lapisan kontor, hidrografi dan pentadbiran telah dihasilkan bagi seluruh negeri Selangor. Berasaskan maklumat kontor dan 'spot height', sebanyak lapan lembar peta 'digital terrain model' telah dihasilkan. Aktiviti integrasi data remote sensing dan data vektor diikuti dengan aktiviti kartografi telah berjaya menghasilkan sebanyak lapan lembar peta SIM. Satu unit 'real-time differential GPS' berharga RM50,000 telah dibeli dalam tahun 1999 bagi mempercepatkan pengumpulan 'ground control points (GCP)'.

Projek SIM adalah satu usaha penyediaan peta topografi berlatar belakangkan imej remote sensing

The SIM Project is aimed to produce a topographic map with remote sensing data in the background



Contoh peta SIM yang telah dihasilkan oleh MACRES  
A sample of SIM map produced by MACRES

## Satellite Image Map (SIM)

Satellite Image Map project was initiated to produce a topographical map of vector data such as road network, contour, river network and administrative boundary with remote sensing data in the background. The database created for SIM project will serve as a base data for NAREM project, currently undertaken by MACRES. To facilitate the development of vector data layer MACRES undertake to implement this project together with JUPEM. In 1999 the development of database for contour, hydrography and administrative boundary for the whole Selangor were accomplished. Eight digital terrain model were generated from contour and spot height. Integration of remote sensing with vector data and cartographic activities had produced eight SIM maps in 1999. One unit real-time differential GPS costing RM 50,000 was purchased in 1999 to expedite the collection of ground control points (GCP).

## **Projek IRPA / IRPA Project**

*MACRES meneruskan pelaksanaan 5 projek IRPA pada tahun 1999*

*MACRES continued implementing 5 IRPA projects in 1999.*

Lima projek IRPA yang dilaksanakan pada tahun 1999 ialah; (1)AIRSAR PACRIM; (2)Pemetaan Guna/Litupan Tanah Menggunakan Data Radar; (3)Pembangunan Penderia Untuk Pemerhatian Bumi Dari Angkasa; (4) Analisis Ciri-ciri Pembalikan Radar dari Pelantar Angkasa dan (5)Pembangunan Model untuk Proses Dinamik Pantai.

Five IRPA projects implemented in 1999 were; (1)AIRSAR-PACRIM programme; (2)Land Use /Cover Mapping Using Radar Data; (3)Development of Sensor for Earth Observation from Space; (4)Analysis of Radar Backscattering Characteristics from Space Platform and (5)Development of A Model for Coastal Dynamic Processes.

### **AIRSAR PACRIM**

Pada tahun 1999 program ini meneruskan analisis dan pemprosesan data POLSAR dan TOPSAR untuk pembangunan aplikasi. Projek ini telah mencapai empat matlamat utama:

- perbezaan litupan tanah mengurangkan tanda-tanda polarmetrik
- struktur geologi dan pemetaan litologi menggunakan TOPSAR data
- mengenalpasti gelombang spektral menggunakan data jalur interferometrik C
- penghasilan maklumat zon pantai dengan menggunakan data TOPSAR dan POLSAR

Hasil projek ini telah dibentangkan dalam dua bengkel AIRSAR PACRIM; pada 10-13 Februari 1999 di Pasadena, California dan pada 23-27 Ogos 1999 di Maui, Hawaii, USA.

### **AIRSAR PACRIM**

In 1999 this programme continued analyses and processing of POLSAR and TOPSAR data for application development. The project achieved four major milestones:

- Land cover discrimination using polarimetric signatures
- geological structure and lithology mapping using TOPSAR data
- wave spectra determination using interferometric C band data
- coastal zone information generation using TOPSAR and POLSAR data

These results were presented at two AIRSAR PACRIM workshops; on 10 - 13 February 1999 at Pasadena, California and on 23-27 August 1999 at Maui, Hawaii in USA.

## PROJEK KERJASAMA / COLLABORATIVE PROJECTS

MACRES meneruskan perlaksanaan projek-projek kerjasama dengan rakan-rakan tempatan dan antarabangsa tahun ini. Kini MACRES sedang melaksanakan penyelidikan bersama-sama agensi antarabangsa seperti China, Canada, Jepun, United Kingdom dan Vietnam dan bersama-sama rakan tempatan seperti Jabatan Perairan dan Saliran(JPS),Universiti Putra Malaysia (UPM) dan Universiti Telekom (UNITELE).

MACRES still continued implementing collaborative projects with its national and international counterparts this year. MACRES is conducting research with international agencies like China, Canada, Japan, United Kingdom and Vietnam and with local partners such as Department of Drainage and Irrigation(JPS), Universiti Putra Malaysia (UPM) and Universiti Telekom (UNITELE).

### *Projek Kerjasama Antarabangsa*

#### *Malaysia – Kanada*

MACRES, bersama Universiti Telekom (UNITELE) dan Canadian Center for Remote Sensing (CCRS), telah memulakan projek bertajuk "Tindakbalas pembalikan SAR pada beberapa peringkat pertumbuhan padi sawah". Projek ini menganalisis tindakbalas pembalikan peringkat tumbesaran padi yang berbeza menggunakan empat data Radarsat pada tahun 1998 dan empat lagi pada tahun 1999. Parameter ini akan membentuk asas pembangunan model bagi ramalan pengeluaran padi pada tahun 2000. Data lapangan diperolehi dengan kerjasama MADA. Keputusan-keputusan yang diperolehi telah dibentangkan di dalam *Malaysian Remote Sensing and GIS Conference* pada 16-18 Mac, 1999 di Shah Alam, Selangor.

*Objektif projek adalah untuk menganalisa tindakbalas pembalikan SAR mengikut beberapa peringkat tumbesaran padi*

*The project objective is to analyse the SAR backscatter response of various stages of padi growth*

### *Joint International Collaborative Projects*

#### *Malaysia - Canada*

MACRES, together with Universiti Telekom (UNITELE) and the Canadian Centre for Remote Sensing (CCRS), initiated a collaborative project entitled "SAR Backscatter Response Of Various Growth Stages of Wetland Rice". The project entailed analysis of backscatter responses corresponding to different growth stages of paddy using four radarsat acquisitions in 1998 and another four in 1999. These parameters will form the basis for development of a rice yield predictive model in 2000. Field data were obtained with the participation of the Malaysian Agricultural Development Authority (MADA). Results were presented in the 2nd Malaysian Remote Sensing and GIS Conference on 16 -18 March, 1999 in Shah Alam, Selangor.

## Malaysia – Japan

MACRES menganjurkan satu bengkel antarabangsa bertajuk 'Forest Canopy Density Mapping' dengan *Japan Overseas Forestry Consultants Association (JOFCA)* dan *International Tropical Timber Organisation (ITTO)* pada 7-8 Jun, 1999, di Kuala Lumpur. Objektif bengkel ini adalah untuk

*MACRES dan JOFCA  
telah bersama-sama  
menganjurkan satu  
bengkel antarabangsa  
Forest Canopy Density di  
Malaysia*

*MACRES together with  
JOFCA organised an  
international workshop on  
Forest Canopy Density in  
Malaysia*

berkongsi pengalaman dalam pegesahan Model *Forest Canopy Density* (FCD) yang dibangunkan oleh JOFCA dan ITTO di Afrika Selatan, Indonesia dan Filipina. Bengkel ini telah dihadiri oleh 25 peserta dari negara anggota ITTO, termasuk 10 peserta dari Malaysia. Selepas seminar tersebut, MACRES dan Jabatan Perhutanan Malaysia telah diminta oleh JOFCA untuk mengesahkan model FCD di Lembah Danum, Sabah.

## Malaysia - Japan

MACRES organised an international workshop entitled 'Forest Canopy Density Mapping' with the Japanese Overseas Forestry Consultants Association (JOFCA) and International Tropical Timber Ogranisation (ITTO) on 7-8 June, 1999, in Kuala Lumpur. The objective of the workshop was to share experience in the verifications of the Forest Canopy Density (FCD) Model developed by JOFCA and ITTO in South Africa, Indonesia and the Philippines. The workshop was attended by 25 participants from member countries of ITTO, including 10 from Malaysians. As a follow-up of the seminar, MACRES and the Forest Department of Malaysia were requested by JOFCA to verify the FCD model in Danum Valley, Sabah.



Seminar antarabangsa "Forest Canopy Density Mapping" yang berlangsung pada 7-8 Jun, 1999, di Kuala Lumpur

*International Seminar on "Forest Canopy Density Mapping" held on 7-8 June, 1999, in Kuala Lumpur*

## Malaysia-United Kingdom / Malaysia-United Kingdom

Projek ini menghasilkan satu algoritma untuk mengesan perubahan litupan hutan

This project generated an algorithm for forest canopy change detection

Sebuah projek bertajuk 'Indicators Of Forest Sustainability (INFORsus)' telah dijalankan di bawah kerjasama Kesatuan Eropah - ASEAN yang dijadualkan untuk 1997-1999, telah siap pada 1999 dan keputusan telah dibentangkan di bengkel INDFORSUS pada April 1999 di Ho Chi Minh, Vietnam. Projek ini telah menghasilkan satu algoritma untuk mengesan perubahan litupan hutan.

A project entitled Indicators of Forest Sustainability (INDFORSUS) carried out under a joint European Union-ASEAN initiation scheduled for 1997-1999, was completed in 1999 and the results were presented in the

INDFORSUS workshop in April 1999 in Ho Chi Minh City, Vietnam. The project generated an algorithm for forest canopy change detection.

## Malaysia-China / Malaysia-China

Dua pakar dari China telah ditugaskan di bawah program NAREM untuk membantu membangunkan rekabentuk pangkalan model dan penyediaan program antaramuka untuk pangkalan data NAREM. Pakar tersebut juga bertanggungjawab untuk memindahkan teknologi kepada ahli-ahli pasukan projek MACRES.

Two experts from China were engaged under the NAREM programme to assist in the model-based design development and preparation of interface programmes for the NAREM database. These experts were also responsible for transfer of technology to the relevant MACRES project team members.

## Malaysia – Vietnam / Malaysia - Vietnam

MACRES dan Hanoi Institute of Oceanography (HIO) telah memulakan projek kerjasama bertajuk 'Coastal Zone Management Using Remote Sensing and GIS'. Tiga sub-projek telah dijalankan—Model for Oil Spill Sensitivity, Fish Potential Mapping dan Zoning Wave Impact on Shore Line Change. Tiga pegawai penyelidik telah ditugaskan di HIO, Hanoi pada 14-27 November 1999 untuk menjalankan aktiviti-aktiviti penyelidikan kerjasama dengan pegawai-pegawai penyelidik Vietnam.

MACRES and the Hanoi Institute of Oceanography (HIO) started implementing a co-operative project entitled 'Coastal Zone Management Using Remote Sensing and GIS'. Three sub-projects were conducted - Model for Oil Spill Sensitivity, Fish Potential Mapping and Zoning Wave Impact on Shore Line Change. Three research officers were attached at HIO, Hanoi on 14-27 November 1999 to carry out joint research activities with Vietnamese counterparts.

MACRES dan HIO melaksanakan projek kerjasama dalam bidang pengurusan pantai

MACRES and HIO implemented a joint project on coastal zone management

MACRES mendapat kerjasama dari China dalam projek pembangunan rekabentuk pangkalan model dan penyediaan program antaramuka untuk pangkalan data NAREM

MACRES obtained assistance from China in the model-based design development and preparation of interface programmes for the NAREM database

### Pembangunan Perkakasan

Untuk mencapai matlamat pembangunan perkakasan, tumpuan diberi kepada dua aspek pembangunan iaitu pembangunan infrastruktur yang melibatkan pembinaan sebuah makmal pembangunan sensor dan pembangunan tenaga manusia bagi menjana kepakaran kakitangan didalam teknologi sensor remote sensing.

Bahagian Pembangunan Perkakasan juga melaksanakan penyelidikan dalam remote sensing gelombang mikro dan projek pembangunan SAR bagi aplikasi remote sensing. Kedua-dua projek ini dijalankan bersama Universiti Telekom (UNITELE). Satu memorandum persefahaman (MOU) telah ditandatangani bagi mewujudkan kerjasama didalam pembangunan dan pengoperasian remote sensing dan bidang-bidang berkaitan.

Projek Pembangunan Remote Sensing Gelombang Mikro bermula pada tahun 1999 dengan jumlah peruntukan sebanyak RM2.5 juta. Objektif utama projek ini ialah untuk membangunkan sebuah makmal radar remote sensing dengan satu sistem *Anechoic Chamber* dan satu sistem *scatterometer* bergerak untuk menghasilkan *Model Terrain Berdigit* (DTM) daripada data radar. Bagi pembangunan sistem *Anechoic Chamber* dan *scatterometer* bergerak,

*Objektif Bahagian  
Pembangunan Perkakasan  
ialah untuk  
membangunkan sensor  
optik dan radar bagi  
tujuan remote sensing*

*The objective of Hardware  
Development Division is  
to develop optical sensor  
and radar for remote  
sensing*

### Hardware Development

To achieve the division's objectives for 1999 emphasis was given on infrastructure development which involved the building of a sensor development laboratory and human resource development in generating skilled personnel in remote sensing sensor technology.

The Hardware Development Division also implemented research in Microwave Remote sensing and development of SAR for remote sensing application. The projects are implemented in collaboration with Universiti Telekom (UNITELE). A memorandum of understanding (MOU) was signed to cooperate in the development and operation of remote sensing and related fields.

The Microwave Remote Sensing Development project started in 1999 with a financial allocation of RM2.5 million. Its main objective of the project is to develop radar remote sensing laboratory with Anechoic Chamber and a system of mobile scatterometer for developing a Digital Terrain Model (DTM) from radar data. For the development of Anechoic Chamber and mobile scatterometer,

penyelidikan dijalankan secara kontrak dengan UNITELE melalui perjanjian perundingan telah ditandatangani oleh MACRES dengan UNITELE pada 29 Disember 1999. Projek ini akan disambung ke tahun 2000 dan dijangka tamat pada penghujung Rancangan Malaysia Ke-8. Bahagian Pembangunan Perkakasan ini juga sedang bekerjasama dengan UNITELE dalam projek pembangunan SAR bagi aplikasi remote sensing. Projek ini bermula pada tahun 1998 dengan peruntukan IRPA sebanyak RM 301,000.00 dan akan dilaksana sehingga tahun 1999. Pemindahan teknologi dari UNITELE ke MACRES, yang merupakan satu komponen dalam projek ini, telah dibuat melalui beberapa siri syarahan tentang prinsip rekabentuk radar dan disampaikan oleh pensyarah-pensyarah UNITELE kepada pegawai-pegawai MACRES.

*the research was contracted to UNITELE through a consultancy agreement signed on 29 December 1999. This project will continue in 2000 and will be completed by the end of the 8<sup>th</sup> Malaysian Plan. The Hardware Development Division is also collaborating with UNITELE on SAR development project for remote sensing application. This project began in 1998 with financial allocation of RM 301,000.00 from IRPA until the year 1999. Technology transfer from UNITELE to MACRES, which is a major component of this project, has been made through a series of lectures on radar design principle given by UNITELE lecturers to MACRES officers.*

*Gambar-gambar yang diambil semasa dua pegawai penyelidik MACRES menjalani latihan sangkut di University of Texas at Arlington, Texas, USA, untuk tujuan projek pembangunan remote sensing gelombangmikro .*

*Photos taken while two MACRES research officers attended an attachment course at the University of Texas at Arlington, Texas, USA, for the purpose of remote sensing microwave development projek.*



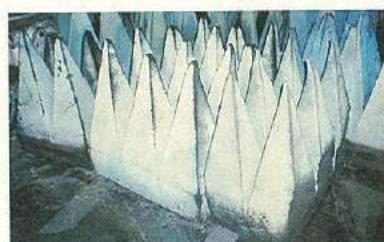
*Sasaran jenis random rough surface yang diguna dalam kajian gelombang mikro.  
Random rough surface target used in microwave experiments.*



*Penyusunan makmal untuk mengukur radar cross-section.  
Laboratory arrangement for measuring radar cross-section.*



*Contoh horn antenna yang digunakan dalam Anechoic Chamber.  
Example of horn antenna used in an Anechoic Chamber*



*Wedge-shaped absorber di dalam sistem Anechoic Chamber.  
Wedge-shaped absorber in an Anechoic Chamber system.*

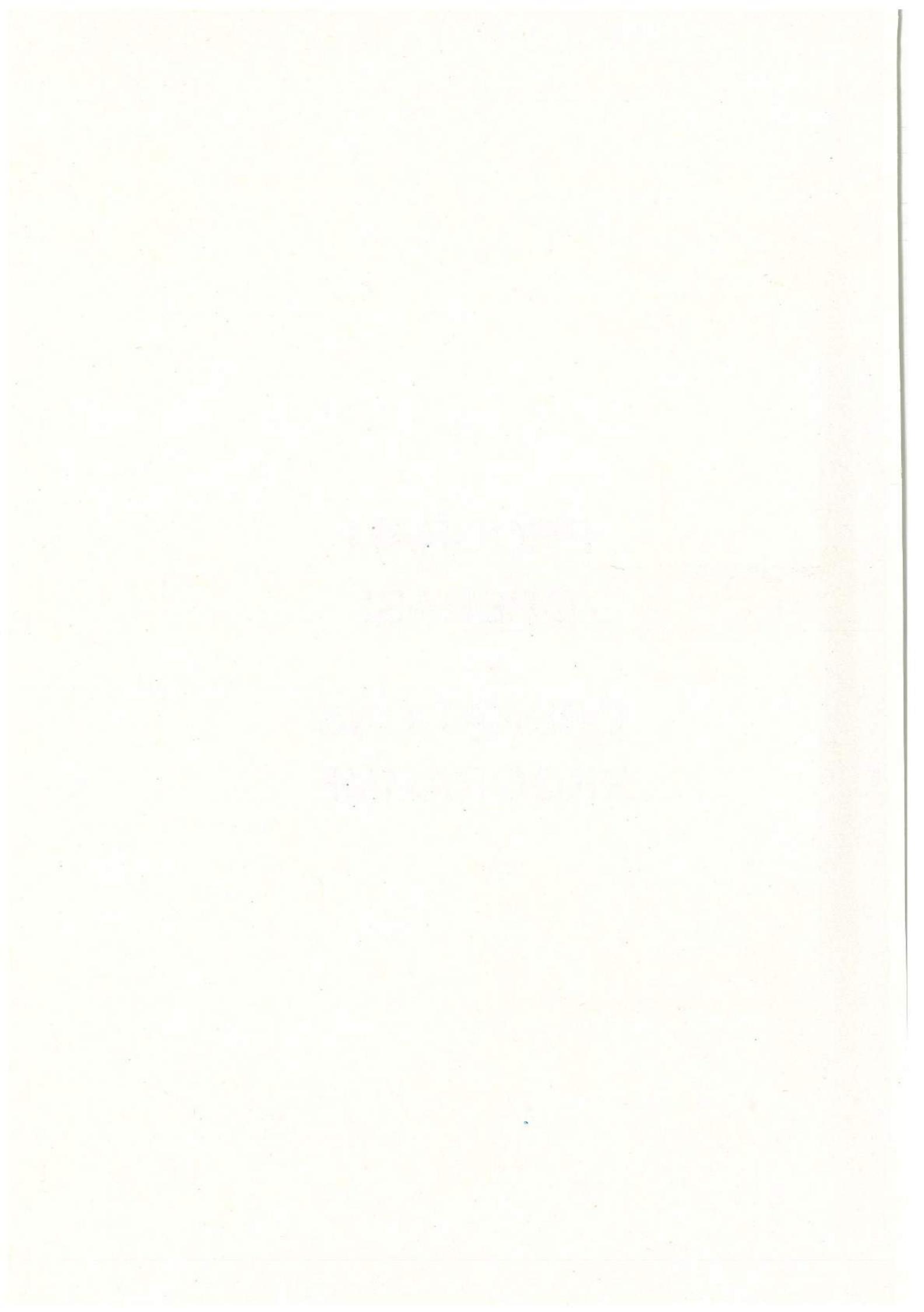
# **PROGRAM OPERASI**

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## **OPERATIONS PROGRAMME**



## Program Operasi / Operations Programme



Pembangunan tenaga manusia  
Human resource development

Program Operasi bagi tahun 1999 memberi keutamaan kepada pelaksanaan empat aktiviti berikut:

The Operations Programmes for 1999 gave priority to the following four activities:

### Pembangunan tenaga manusia Human resource development

- kursus pendek
- kursus ijazah lanjutan
- seminar/konferen
- kollokium
- bengkel
- ceramah

- short courses
- postgraduate courses
- seminar/conference
- colloquium
- workshop
- talks

### Pembangunan fizikal dan kemudahan

- ibu pejabat baru
- bangunan stesen bumi
- perolehan perkakasan dan perisian
- kemudahan internet

### Physical development and facilities

- new office building
- ground station building
- hardware and software acquisition
- internet facilities

### Perkhidmatan pengguna

- perkhidmatan data
- promosi dan penyebaran maklumat teknologi remote sensing
- perkhidmatan korporat

### User services

- data services
- promotion and dissemination of remote sensing technology information
- corporate services

### Aktiviti antarabangsa

### International activities



Aktiviti antarabangsa  
International activities

## PEMBANGUNAN TENAGA MANUSIA (PTM)

Sebagai sebuah institusi penyelidikan yang berdasarkan teknologi remote sensing, MACRES amat memerlukan kakitangan teknikal yang terlatih dan sentiasa terdedah kepada perkembangan terkini dalam teknologi tersebut. Selaras dengan keperluan ini MACRES telah melaksanakan program pembangunan tenaga manusia melalui program ijazah lanjutan, kursus jangka pendek dan panjang, latihan sambil bekerja dan seminar di peringkat kebangsaan dan antarabangsa. Program pembangunan tenaga manusia ini dibiayai oleh Tabung Pembangunan Sumber Manusia, KEMSAINS, peruntukan PTM MACRES dan peruntukan projek NAREM serta IRPA. Disamping keperluan latihan, beberapa inisiatif telah dirancang untuk mengambil tenaga pakar dari luar negara untuk tujuan pemindahan teknologi dan meningkatkan kapasiti kepakaran kakitangan teknikal.

Di sepanjang tahun 1999, MACRES telah menyelaraskan sebanyak 71 latihan, dimana 14 adalah di peringkat antarabangsa dan 57 adalah di dalam negara. Latihan merangkumi kursus teknologi remote sensing, pembangunan organisasi, komunikasi dan pentadbiran.

*Program PTM MACRES melibatkan aktiviti latihan untuk meningkatkan bilangan kakitangan mahir & terlatih bagi menyokong pelaksanaan program penyelidikan dan pengoperasian teknologi remote sensing.*

*MACRES HRD entails training activities to increase skilled and trained manpower to support R&D*



Seminar Projek Pembangunan MACRES

MACRES Development Projects Seminar

## HUMAN RESOURCE DEVELOPMENT (HRD)

Being a research institution based on remote sensing technology, MACRES needs well trained technical staff who are always exposed to current development in the technology. In line with this requirement, MACRES implemented its human resource development programme which comprised postgraduate courses, short and long-term courses, on-the-job trainings and national and international seminars. These programmes were funded by the KEMSAINS Human Resource Development Fund, MACRES HRD allocation and project fundings from NAREM and IRPA. Besides technical trainings, MACRES had outsourced international experts as an effort for technology transfer along with increased in knowledge and expertise in remote sensing and related technologies.

To fulfill the above objective, MACRES has organised 71 courses/training whereby 14 were international courses and 57 were local. Priority was given to topics on remote sensing and relevant technologies, organisational development, communication and administration.

Selain itu, kursus asas remote sensing peringkat kebangsaan telah diadakan untuk pegawai MACRES dan agensi pengguna pada 4 Oktober-27 November 1999. Peserta terdiri dari 24 pegawai profesional dari pelbagai agensi kerajaan, termasuk 14 orang dari MACRES, dan seorang dari agensi swasta. Kursus dua bulan ini dianjurkan dengan kerjasama Universiti Teknologi Malaysia (UTM), Johor. Ceramah mengenai tajuk-tajuk khusus remote sensing turut diadakan dengan penglibatan pakar-pakar luar negara dan pakar tempatan. Bagi kursus ijazah lanjutan pula, enam orang pegawai MACRES ditawarkan mengikuti kursus sarjana remote sensing di universiti tempatan dalam tahun 1999. Selaras dengan objektif untuk meningkatkan daya usaha serta kemahiran pegawainya, MACRES juga menyediakan landasan untuk pembentangan isu-isu teknikal melalui kolokium mingguan. Setiap pegawai yang telah berkursus dikehendaki berkongsi pengalaman masing-masing melalui kolokium pada setiap Sabtu. Sebanyak 20 kolokium telah dianjurkan tahun ini.

In addition, a national level course in basic remote sensing was also conducted for MACRES officers and user agencies from 4 October - 27 November 1999. Participants were 24 from various government agencies, including 14 from MACRES, and one from a private agency. The two months-course was conducted in collaboration with Universiti Teknologi Malaysia (UTM), Johore. As for postgraduate courses, six MACRES officers were offered to undertake post-graduate courses in remote sensing at local universities in 1999. Talks on specific remote sensing topics were also held with the involvement of overseas and local experts. With the objective to motivate officers and to increase their skill, MACRES also provides a platform for the presentation of technical issues in its weekly colloquium. Officers who went for training are required to share their experience in a colloquium held every Saturday. A total of 20 colloquia were conducted this year.



Seminar Kebangsaan NAREM pada 28 Jun 1999, di INTAN, Bukit Kiara  
National NAREM Seminar held on 28 June 1999, at INTAN, Bukit Kiara

**Kursus-kursus anjuran MACRES bagi tahun 1999**  
**Courses organised by MACRES in 1999**

BIL. NO	TARIKH DATE	KURSUS COURSE	PESERTA PARTICIPANTS	TEMPAT PLACE
1	28 Mei	Kursus Pengenalan Linear Programming	1	MACRES
2	7-8 Jun	Seminar On The Dissemination Of The New Remote Sensing Methodology Through Semi-expert System	5	MACRES
3	14-25 Jun	Landslide Hazard Zonation Workshop	3	Hotel Crown Princess, K.L.
4	28 Jun	Seminar NAREM Kebangsaan	5	INTAN. Bkt. Kiara
5	20-21 Julai	Seminar On Utilisation Of Remote Sensing And Related Technologies For Precision Farming	4	Hotel Pan Pacific,K.L.
6	2-6 Ogos	Kursus Orientasi MACRES	5	MACRES
7	27 September	Seminar Teknologi Remote Sensing Untuk Pengurusan Sumber Air	12	Kuching,Sarawak
8	4 Oktober-27 November	Kursus Asas Remote Sensing	14	UTM, Skudai
9	5-11 November	Job Attachment	3	ITC, Holland
10	9-11 November	Job Attachment	3	Vietnam
11	29 November-24 Disember	Attachment Training For Ground Based Scatterometer & Anechoic Chamber	2	Texas University, USA

**Kursus-kursus Teknikal / Technical Courses  
1999**

BIL. NO.	PESERTA PARTCIPANTS	AKTIVITI ACTIVITIES	TARIKH DATE	TEMPAT PLACE
1.	1	2 <sup>nd</sup> Meeting of the Working Groups on Sub -Regional Fire Fighting Arrangements(SRFA) for Sumatra and Borneo	25-26/2/99	Singapura
2.	2	Mesyuarat Pemetaan dan Data Spatial	9-10/3/99	Labuan,Sabah
3.	13	2 <sup>nd</sup> Malaysian Remote Sensing & GIS Conference	16-18/3/99	ITM, Shah Alam
4.	1	Global Observation Information Network Workshop '99(GOIN 99)	22-24/3/99	Hawaii
5.	1	Solaris 2.X Performance Mnagement and Tuning	22-26/3/99	Sun Microsys, K.L.
6.	1	Seminar on ESI Mapping in Malaysian Coastal Habitats	25/3/99	Istana Hotel, K.L.
7.	2	ASEAN CANADA Workshop on Sustainable Management of Natural Resource & Coastal Environment	29-31/3/99	Bali, Indonesia
8.	4	Seminar "Water: Forestry & Landuse Perspective)	30-31/3/99	FRIM.K.L.
9.	1	Kursus Methodologi Penyelidikan	4-20/4/99	INTAN, Bkt. Kiara
10.	2	Job Attachment -NAREM	3-22/5/99	UTM, Johor
11.	1	Bengkel Comprehensive ER Mapper	6/5/99	KL
12.	1	37 <sup>th</sup> ASEAN-COST Meeting	17-21/5/99	Rangoon, Myanmar
13.	1	Asia-Pacific Regional Space Agency Forum(APRSAF -6)	24-27/5/99	Tokyo, Jepun
14.	2	Sarjana Sains (Remote Sensing & GIS)	24/5/99 – 24/5/2000	UPM
15.	1	Kursus Pendek "Mathematical Modelling of Water Resources: An Overview of Real World Application"	26/5/99	UTM, Johor
16.	1	Kursus Pengenalan Linear Programming	28/5/99	MACRES
17.	5	Seminar on the Dissemination of the New Remote Sensing Methodology Through Semi Expert System	7-8/6/99	MACRES

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18.	1	Intergovermental Consultative Commitee	7-11/6/99	Bangkok
19.	2	Seminar Kecergasan Eksekutif	11-13/6/99	Selesa Hillhomes
20.	1	ASEAN-Australia Final Seminar	13-15/6/99	Vietnam
21.	1	International Flood Forecasting Workshop for Tropical Regions	14-17/6/99	JPS
22.	3	Landslide Hazard Zonation Workshop	14-25/6/99	Hotel Crown Princess
23.	1	International Flood Forecasting Workshop for Tropical Regions	14-17/6/99	JPS
24.	1	GPS for GIS	15-17/6/99	UTM,Johor
25.	2	12 <sup>th</sup> Meeting of ASEAN Experts Group on Remote Sensing(AEGRS)	16-18/6/99	Vietnam
26.	1	The 1999 Malaysian Survey Congress	18-19/6/99	K.L
27.	5	Seminar Kebangsaan NAREM	28/6/99	INTAN, Bkt. Kiara
28.	1	13 <sup>th</sup> Meeting of ASOEN Technical Task Force & 7 <sup>th</sup> ASEAN Ministerial Meeting on Haze	5-6/7/99	Putrajaya
29.	4	Seminar on Utilization of Remote Sensing and Related Technologies for Precision Farming	20-21/7/99	Hotel Pan Pacific,K.L.
30.	1	Penggubalan Dasar Pengurusan Zon Pantai	22-23/7/99	INTAN, Bkt. Kiara
31.	1	Workshop on Application of Information Technology in Forestry	23-24/8/99	FRIM, K.L.
32.	1	Pacific RIM Significant Results and Planning Meeting and Workshop	24-26/8/99	Hawaii
33.	1	The Meeting of Experimental Application of Future Communication/Broadcasting Satellite ETS-VII and GIGABIT	25-27/8/99	Tokyo, Jepun
34.	1	Symposium "Protection of Industrial Designs in Malaysia"	26/8/99	INTAN,Bkt Kiara
35.	2	GIS Asia Pacific Conference & Exhibition	1/9/99	Singapura
36.	1	NALIS-Arc View/Arc View IMS	7-14/9/99	KL
37.	4	8 <sup>th</sup> ESRI South Asia User Conference Tour 1999	8-9/9/99	Saujana Hotel, Subang
38.	1	UN-CHINA-ESA Conference on Space Application for Sustainable Agriculture	14-17/9/99	Beijing, China

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39.	1	National IRPA WORKSHOP on Environmental Sector	22-23/9/99	UPM, Selangor
40.	13	Seminar Teknologi Remote Sensing Untuk Pengurusan Sumber Air	27/9/99	Kuching, Sarawak
41.	14	Kursus Asas Remote Sensing	4/10- 27/11/99	UTM,Johor
42.	1	Training Program on Coastal Zone Monitoring and Management	11-22/10/99	AIT, Thailand
43.	1	Latihan Optivity 8.X	12-15/10/99	Singapura
44.	1	International Symposium & Exposition on Coastal Environment & Management	13-15/10/99	Sheraton Imperial, K.L.
45.	2	Bengkel Dasar Satelit Negara Dalam Konteks Pengurusan Angkasaraya	23/10/99	Hotel Equatorial, Bangi
46.	1	Training Course on Remote Sensing Technology(Advanced)	26/10- 5/12/99	Jepun
47.	3	Job Attachment	5-26/11/99	ITC, Holland
48.	2	Job Attachment	15-27/11/99	Vietnam
49.	2	1999 Annual Seminar of Geoinformation Engineering	17-18/11/99	UTM,Johor
50.	1	Computer Aided Workshop on Groundwater Contamination	18-26/11/99	KL
51.	2	ASEAN Conference on Remote Sensing	23-25/11/99	Hong Kong
52.	2	Attachment training for ground based scatterometer & anechoic chamber	29/11 – 24/12/99	University of Texas
53.	1	Ministrial Conference on Space Applications for Sustainable Development in Asia and the Pacific	18-20/12/99	New Delhi, India
54.	1	Seminar Standard GIS	2/12/99	K.L

**Kursus-kursus Sokongan / Supporting Courses  
1999**

BIL. NO.	PESERTA PARTICIPANTS	KURSUS COURSES	TARIKH DATE	TEMPAT PLACE
1.	5	Kursus Induksi Khusus	16-18/3/99	KSTAS
2.	1	Kursus Penulisan Laporan Berkualiti	22-26/3/99	INTAN,Bkt. Kiara
3.	1	Pasukan Simpanan Sukarela TLDM	22/3/99	KD Seri Klang
4.	2	Kursus Intensif Pengurusan Aset dan Stor	22-25/3/99	MINT
5.	1	Kursus Asas Perakaunan	21-22/4/99	JAN
6.	1	Kursus Keselamatan Perlindungan Asas Pendaftaran Rahsia	27-29/4/99	WISMA PKNS. KL
7.	1	Sistem Belanjawan	17-21/5/99	INTAN,Bkt. Kiara
8.	1	English for effective communication through distance learning	17-28/5/99	INTAN Jalan Elmu
9.	1	Kursus Kaunseling 1	25-28/5/99	Langkawi
10.	1	Kursus Induksi Umum	2-16/6/99	INTAN,Bkt. Kiara
11.	2	Seminar Kecergasan Eksekutif	11-13/6/99	Selesa Hillhomes
12.	1	Kursus Perakaunan Perbelanjaan dan Bayaran di Jabatan Kerajaan	14-16/6/99	JAN
13.	1	Kursus Write It Right "Effective Writing Skills'	28/6-9/7/99	INTAN Jalan Elmu
14.	2	Workshop on Marketing of Library and Information Services	14-15/7/99	UNITAR
15.	1	Kursus Sistem Belanjawan Diubahsuai	24-29/7/99	INTIM
16.	1	Bengkel Persembahan Berkesan dengan Menggunakan Teknologi Multimedia(Asas)	2-6/8/99	INTAN, Bkt. Kiara
17.	1	Symposium "Protection of Industrial Designs In Malaysia"	26/8/99	INTAN,Bkt. KIARA

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18.	1	Kongres Ekonomi Bumiputera Keempat	10-11/9/99	PWTC
19.	1	Kursus Peningkatan Penguasaan Bahasa malysia Penulisan Surat Rasmi dan Memo	20-23/9/99	INTAN Jalan Elmu
20.	2	Kursus Kewangan	20-24/9/99	Genting Highlands
21.	1	Kursus Organisasi Pembelajaran	21-23/9/99	INTAN,Bkt.. KIARA
22.	1	Seminar Kebangsaan Islam dan Rekrreasi	23-24/9/99	JAKIM
23.	1	Kursus Pengurusan Cuti dan Kemudahan Perubatan	26-27/9/99	Langkawi
24.	2	Kursus SISPEN versi 3.11	27-29/9/99	JPA
25.	2	Kursus Perhubungan Awam Berkualiti	4 -7/10/99	Langkawi
26.	5	Majlis Amanat dan Dialog Bersama Y.A.B. Perdana Menteri	15/10/99	Sg. Besi, Selangor
27.	1	Kursus Penilaian Program	25/10/99	INTAN,Bkt. Kiara
28.	1	Kursus Kaunseling 1	27-30/10/99	Langkawi
29.	1	Kursus Peningkatan Prestasi Pem. Tadbir Rendah/Pem. Am Rendah	29/9-2/10/99	Langkawi
30.	1	Web Site Development (Frontpage)	1-5/11/99	IKRAM
31.	2	Kursus Keselamatan Perlindungan (Asas Kawalan Keselamatan)	9-11/11/99	JPM
32.	2	National Productivity Conference '99	22-23/11/99	Hotel Legend KL

## PEMBANGUNAN FISIKAL DAN KEMUDAHAN PHYSICAL DEVELOPMENT AND FACILITIES

### *Bangunan Ibu Pejabat Baru MACRES / MACRES New Headquarters Building*

*MACRES meneruskan projek pembinaan ibu pejabat baru dan stesen penerimaan bumi.*

*MACRES continued the construction of its new headquarters building and ground receiving station projects.*

Bangunan ibu pejabat baru MACRES telah siap dibina pada bulan Jun dan diduduki pada 1 Julai 1999. Walau bagaimanapun, pelbagai komponen sistem pintar bangunan masih di peringkat pemasangan, pengujian dan pentauliahan.

The new headquarters building was completed in June and occupied on 1 July 1999. Nevertheless, various components of the intelligent systems were still at different stages of installation, testing and commissioning.



*Pandangan hadapan bangunan ibu pejabat baru MACRES  
Front view of MACRES headquarters building*

### *Kompleks Stesen Bumi / Ground Receiving Station Complex*

Penyerahan kompleks bangunan yang pada asalnya dijadualkan pada akhir tahun 1999 ditangguhkan kerana kelewatan di dalam kerja-kerja pengujian pelbagai sistem mekanikal dan elektrikal. Kemajuan projek pada akhir tahun 1999 telah mencapai 99% siap.

The handing over of the building complex, initially scheduled at the end of the 1999, has been deferred due to a delay in the testing and commissioning of the mechanical and electrical systems. As of the end of 1999, the project was 99% completed.



### Makmal Kartografi / Cartographic Laboratory

Di bawah projek Pemetaan Imej Satelit(SIM), Makmal Kartografi bertanggungjawab menghasilkan produk SIM dan spesifikasi kartografi. Dalam tahun 1999, lapan lembaran peta Negeri Selangor telah disiapkan. Deraf spesifikasi kartografi untuk SIM juga disediakan untuk kelulusan JUPEM. Peta-peta topografi tambahan telah diperolehi bagi menggantikan peta-peta yang digunakan untuk tujuan *digitizing*. Sementara itu, Makmal Kartografi juga membeli peta-peta digital dan cetak kekal dari JUPEM bagi tujuan membantu kerja-kerja analisa penyelidikan di MACRES. Jadual menunjukkan bahan-bahan terhad dalam arkib makmal tersebut.

Under the Satellite Image Map (SIM) project, the Cartographic Laboratory is responsible for producing SIM products and cartographic specifications. In 1999, eight map sheets of Selangor state were produced. Cartographic specification for SIM was also drafted for approval from the Malaysian Survey and Mapping Department(JUPEM). Additional topographical maps were also procured to replace those used for digitizing purposes. Meanwhile, the Cartographic Laboratory also purchased digital and hardcopy maps from JUPEM. These maps were acquired to support research activities in MACRES. Table shows restricted materials available in the laboratory archive.

**Jumlah bahan terhad/Total number of restricted materials**

Jenis/Type	Jumlah /Total
1.Peta Topografi siri L7030 (Skala 1:50 000) Topographic map L7030 series (Scale 1:50 000)	451
2.Peta Topografi siri L7010 (Skala 1:63 360) Topographic map L7010 series (Scale 1:63 360)	136
3.Peta Topografi siri T735 (Skala 1:50 000) Topographic map T735 series (Scale 1:50 000)	337
4.Peta Topografi siri L8010 (Skala 1:25 000) Topographic map L8010 series (Scale 1:25 000)	407
5.Peta Topografi siri L808 (Skala 1:10 000) Topographic map L808 series (Scale 1:10 000)	45
6.Peta "stable base" siri L7030 (Skala 1:50 000) "Stable base" map L7030 series (Scale 1:50 000)	21
7.Peta "stable base" siri T735 (Skala 1:50 000) "Stable base" map T735 series (Scale 1:50 000)	12
8.Peta Grafik Operasi Bersama siri 1501 JOG (Darat) Joint Operation Graphics Map 1501 series JOG (Land)	16
9.Data Topografi Berdigit siri L7030 (Skala 1:50 000) Digital Topographic Data L7030 series (Scale 1:50 000)	1
10.Data Topografi Berdigit siri T735 (Skala 1:50 000) Digital Topographic Data T735 series (Scale 1:50 000)	36
11.Data Topografi Berdigit siri T738 (Skala 1:50 000) Digital Topographic Data T738 series (Scale 1:50 000)	2
12.Data Topografi Berdigit siri T8028 (Skala 1:25 000) Digital Topographic Data T8028 (Scale 1:25 000)	54
13.Gambar Udara Hitam Putih Black and White Aerial Photographs Skala/Scale 1:40 000 Skala/Scale 1:25 000 Skala/Scale 1: 10 000	1684 6 2043
14.Gambar Udara berwarna Coloured Aerial Photographs Skala/Scale 1:10 000	398

## Peningkatan Sistem

Pemindahan sistem komputer ke ibu pejabat baru MACRES di Jalan Tun Ismail dilaksanakan melalui dua peringkat:(1) pemindahan sistem *client/server* dan 23 komputer peribadi oleh syarikat ANSI Sdn Bhd. dan (2)pemindahan sistem Mikrovax / Meridian oleh syarikat F.J. Edar Sdn. Bhd. Kos keseluruhan pemindahan peralatan tersebut adalah berjumlah RM68,500. Sementara itu, MACRES telah membelanjakan RM140,550 bagi peningkatan sistem dan perkakasan tahun 1999. Peningkatan ini melibatkan penambahan ruang storan Sun Server sebanyak 80GB bagi menyokong aktiviti penyelidikan dan perkhidmatan data pengguna. Pertukaran *network card* dari jenis UTP kepada jenis *fibre compatible* dan *converter* dilaksanakan untuk 23 komputer peribadi dan 7 stesen kerja Sun dan SGI memandangkan bangunan ibu pejabat baru dilengkapi dengan Sistem Rangkaian Setempat yang berasaskan *Fibre Optic*. Peningkatan peralatan/perisian komputer yang melibatkan pembelian 50 komputer peribadi model Intel Pentium III untuk setiap pegawai penyelidik MACRES telah dibuat melalui satu tender. Kemudahan ini ialah untuk meningkatkan keupayaan pemerosesan data remote sensing dan GIS serta automasi pejabat.

*Objektif utama  
peningkatan sistem  
ialah untuk  
membangunkan  
keupayaan MACRES  
bagi memenuhi  
permohonan data  
remote sensing oleh  
pengguna dan  
menyediakan  
perkakasan dan  
perisian yang sesuai  
bagi memproses serta  
menganalisa data  
remote sensing/GIS  
bagi tujuan projek  
penyelidikan*

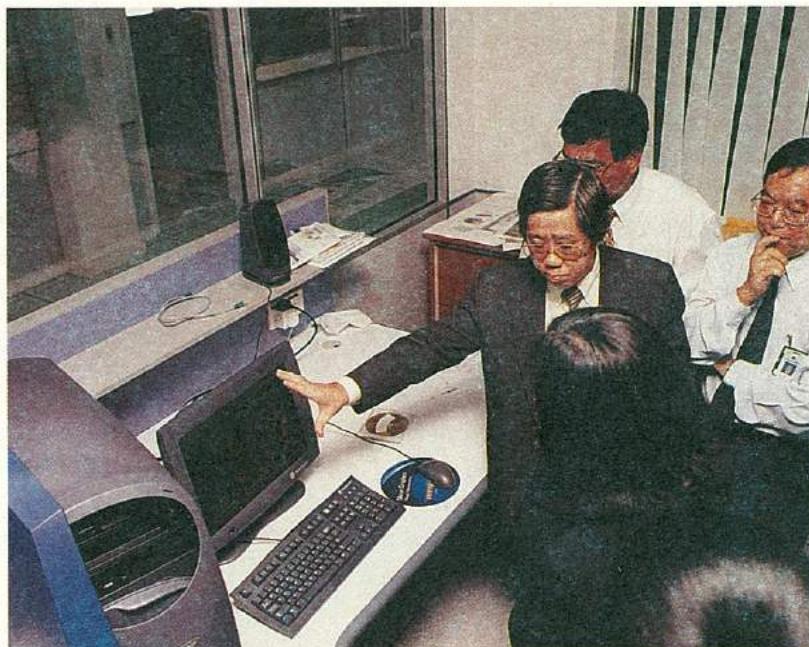
## System Upgrading

Transfer of computer systems to MACRES new headquarters on Jalan Tun Ismail was implemented in two stages:(1) transfer of client/server system and 23 personal computers by Syarikat ANSI Sdn. Bhd. and (2) transfer of Mikrovax/Meridian system by Syarikat F.J. EDAR Sdn. Bhd. A total cost of RM68,500 was spent for the transfer. Meanwhile, the system and hardware upgrading in 1999 costed RM40,550. This upgrading involved storage increase of up to 80 GB for SUN server to facilitate research activities and user data services. Replacement of network card of UTP-type to fibre compatible and converter was performed on 23 personal computers and 7 SUN and SGI workstations as the new headquarters building is equipped with a fibre Optic Local Area Network System. Procurement of computer hardware/software involving 50 units of Intel Pentium III personal computers for each research officer was conducted through a tender. This is to facilitate remote sensing and GIS data processing and office automation.

*The primary objective  
of systm upgrading is  
to enhance MACRES  
capability in meeting  
demands for remote  
sensing data from users  
and to provide suitable  
hardware and software*

Setiap komputer peribadi telah disambungkan kepada sistem *local area network* (LAN) untuk kemudahan *e-mail*, internet dan intranet. Perkakasan lain yang diperolehi tahun ini adalah terdiri dari tujuh unit *notebook* untuk kegunaan kerja lapangan persembahan dalam seminar, tujuh unit stesen kerja visual (empat dimuatkan dengan perisian ERDAS Imagine, satu sebagai NT server bagi projek *Homepage* MACRES dan dua untuk projek kerjasama MACRES-UNITELE. Lima perisian telah juga dibeli. Ini termasuk perisian analisa statistik SAS (untuk projek penyelidikan), *Internet Map Server (IMS)*, Microsoft Office 2000 (untuk automasi pejabat), Norton 2000 versi 6.0 (untuk kemudahan *antivirus*) dan perisian MATLAB (untuk memproses *radar signal*). Kos keseluruhan tender ialah RM2.18 juta, yang mana telah diambil dari peruntukan peningkatan sistem dan perkakasan, projek Jaringan Komunikasi Data Remote Sensing MACRES, RSGM dan peruntukan projek NAREM.

Each personal computer is connected to a local area network (LAN) system for e-mail, internet, and intranet facilities. Other hardwares that had been acquired include seven notebooks for fieldwork and seminars presentations, seven *visual workstations* (four are installed with ERDAS Imagine software, one for NT server of MACRES Homepage project and two for MACRES-UNITELE cooperatorative project). Five softwares were also purchased. These include a statistical analysis software SAS (for research projects), Internet Map Server (IMS), Microsoft Office 2000 (for office automation), Norton 2000 version 6.0 (for antivirus utility) and MATLAB software (for processing radar signals). The tender costed RM2.18 million, which was taken from the allocations for system and hardware upgrading, MACRES Remote Sensing Data Communication Network project, RSGM and NAREM project.



Sistem komputer SGI untuk pemrosesan imej  
SGI computer system for image processing

## PERKHIDMATAN PENGGUNA / USER SERVICES

Sebagai usaha meningkatkan penggunaan teknologi remote sensing di Malaysia, MACRES menyediakan dua jenis perkhidmatan pengguna:

- Perkhidmatan data remote sensing
- Perkhidmatan maklumat dan aktiviti promosi

In its effort to facilitate use of remote sensing technology in Malaysia, MACRES provides two types of user services:

- Remote sensing data services
- Information services and promotional activities

### **Perkhidmatan Data Remote Sensing**

Aktiviti MACRES dalam tahun 1999 telah meningkatkan penggunaan teknologi remote sensing dalam negara. Ini ditunjukkan oleh jumlah permohonan data remote sensing yang tinggi oleh pengguna dari agensi kerajaan dan swasta disepanjang tahun 1999. Data yang dipohon biasanya diguna untuk tujuan pengurusan sumber-sumber asli nasional dan pembangunan infrastruktur. Data remote sensing yang diperolehi dalam tahun 1999 terdiri daripada data satelit jenis optikal dan radar seperti Landsat TM, SPOT, ERS-1 dan Radarsat. Perolehan data tahunan ini dibuat berdasarkan keperluan data pengguna. Jumlah perolehan mengikut jenis data satelit adalah seperti berikut:

*Perkhidmatan data  
MACRES merangkumi  
dua aktiviti utama:  
perolehan data remote  
sensing dan  
pemprosesan data  
mengikut spesifikasi  
pengguna.*

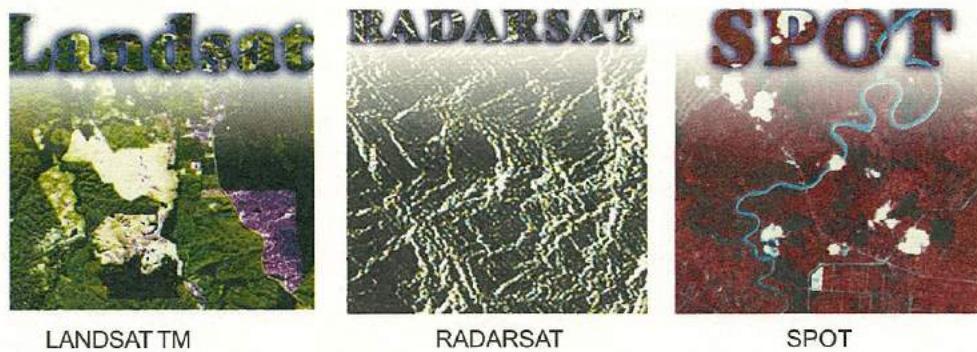
*MACRES data services  
comprise two major  
activities: remote  
sensing data  
acquisition and data  
processing according  
to user's specifications*

### **Remote Sensing Data Services**

MACRES activities in 1999 managed to increase the use of remote sensing technology in the country. This is reflected in the number of remote sensing data requests by users in the public and private agencies throughout the year. Data requested were usually for national natural resources management and infrastructural development. Remote sensing data acquired in 1999 comprise optical and radar satellite data such as Landsat TM, SPOT, ERS-1 and Radarsat. This annual acquisition is in accordance to users' data requests. Total acquisition with respect to satellite data types are as follows :

<b>Pembelian data satelit (1999)</b> <b>Satellite data acquisition (1999)</b>	
<b>Jenis data</b> <b>Data types</b>	<b>Jumlah scene</b> <b>No. scenes</b>
Landsat TM	28
SPOT	55
Radarsat	65

Jenis data  
Data types



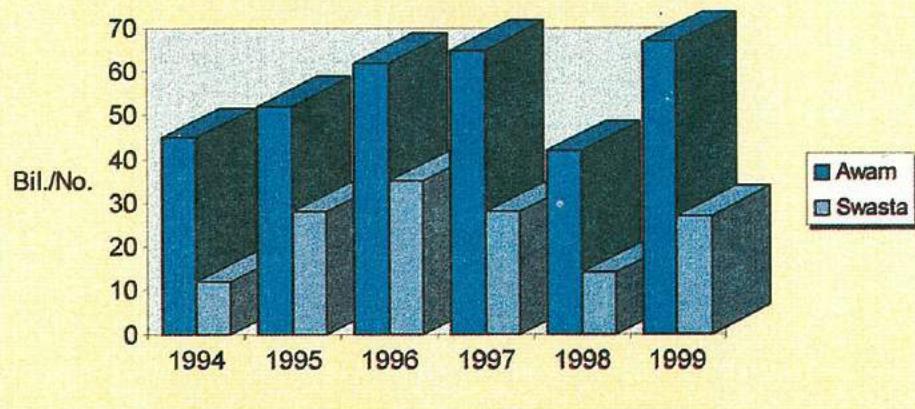
Pada tahun ini sebanyak 83 permohonan diterima dari agensi pengguna. Ia melibatkan pemprosesan sejumlah 266 scenes, iaitu cetak kekal sebanyak 103 keping dan digital sebanyak 163. Corak permohonan data remote sensing dalam tahun 1999 berbanding dengan tahun-tahun yang lepas adalah seperti berikut:

This year a total of 83 remote sensing data requests were received from user agencies. These involved processing of 266 scenes of which 103 were hardcopies and 163 digital. Trend of data requests for 1999 as compared to recent years is as follows:

Hasil jualan data (1999)  
Data sales (1999)

Hasil Revenue	RM 214,500
Amanah Trust	RM 42,500
<b>JUMLAH TOTAL</b>	<b>RM257,000</b>

Permohonan Data/Data Requests (1994-1999)



### **Aktiviti ISO 9002 MACRES**

Penglibatan MACRES dalam ISO 9002 adalah bagi menyediakan perkhidmatan bermutu tinggi dan membekalkan satu piawaian data yang berkualiti tinggi selaras dengan kehendak pelanggan. Aktiviti ini telah bermula pada tahun 1998 dengan mengenalpasti aktiviti Perkhidmatan Data sebagai proses utama MACRES ke arah mendapatkan pengiktirafan ISO 9002. Disamping itu, Dasar Kualiti dan Objektif Kualiti MACRES juga diperkenalkan bagi Perkhidmatan Data.

Beberapa J/Kuasa Kualiti di peringkat MACRES telah ditubuhkan untuk memastikan keberkesanan perlaksanaan. Program perlaksanaan ISO 9002 ini melibatkan penyediaan dokumen induk, Manual Kualiti MACRES dan 19 dokumen Prosedur Kualiti yang berkaitan dengan perkhidmatan data untuk pengguna. Dalam tahun 1999, MACRES telah mengemaskini draf kedua dokumen dengan hasrat untuk mendapatkan status ISO 9002 pada April 2000.

### **Aktiviti ISO 9002 MACRES**

MACRES involvement in ISO 9002 is to provide high quality services and standardised quality remote sensing data for maximum customer satisfaction. The activity was initiated since 1998, for which Data Services activities were identified as the core process for MACRES ISO 9002 certification. Concurrently, MACRES Quality Policy and Quality Objectives for Data Services were also introduced.

Relevant Quality Committees were established to ensure effective implementation. The ISO 9002 programme involved documentation of the master document, MACRES Quality Manual and 19 Quality Procedures which covered data services procedures to users. The second draft of the ISO 9002 documents was updated in 1999, with the intention of attaining certification in April 2000.

**PEROLEHAN DATA SATELIT TAHUN 1999**  
**SATELLITE DATA ACQUISITION 1999**

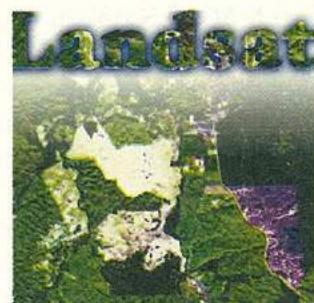
**Senarai data Landsat TM**  
**Landsat TM data list**

**Sumber data : NRCT**

**Data Source : NRCT**

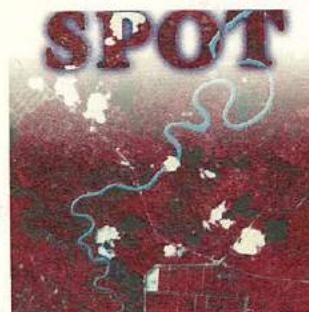
**Tahap pemprosesan : Tahap 4**

**Processing level : Level 4**



No.	Path/Row	Date of Acquisition	Cloud %	Location
1.	116/57	121298	0427	Tawau
2.	117/55	260499	2732	Pitas
3.	117/56	150799	2173	Sandakan
4.	118/55	200699	9840	Kudat
5.	118/56	120299	1235	Kota Kinabalu
6.	118/57	200898	3434	Seri Begawan
7.	119/54	070399	4340	Spartly
8.	119/55	150198	0200	Spartly
9.	120/54	040799	2740	Spartly
10.	120/55	040799	2064	Spartly
11.	120/58	040799	3111	Sibu
12.	120/59	180699	1878	Sri Aman
13.	121/54	090699	1010	Spartly
14.	121/55	090699	0000	Spartly
15.	121/59	080599	1713	Kuching
16.	122/54	150798	4041	Spartly
17.	125/59	040798	2879	Johor Bahru
18.	126/57	080399	1331	Kuantan
19.	127/58	110299	0342	Kuala Lumpur
20.	128/56	180299	0085	P. Pinang
21.	128/56	220399	2452	P. Pinang
22.	128/57	020299	6274	Taiping
23.	128/57	220399	9379	Taiping
24.	118/56 Q3	241198	-	Labuan
25.	125/58 Q3	200798	-	Mersing
26.	126/56 Q3	151098	-	K. Trengganu
27.	128/56 Q12	020299	-	P. Pinang
28.	129/56 Q2	090299	-	West Langkawi

**Senarai data SPOT**  
**SPOT data list**



**SPOT XS**

No.	K/J	Date of Acq.	Cloud%	Location
1.	265/337	99/03/19	CCCCBCBC	Emp. Timah Tasoh
2.	266/337/8	99/02/15	BBBBBBBBBB	Nami
3.	266/337/9	99/02/15	BBABBBBBBB	Emp. Pedu/Sg. Merbok
4.	266/338/6	99/02/15	BBBBBABBBB	K. Merbok
5.	266/340	99/01/22	BBBBBABA	Larut-Matang
6.	266/341	99/01/22	ABBACBDB	Larut-Matang
7.	267/339	99/10/20	BAAABBBB	Gerik
8.	268/341	99/05/27	BCBDBCCD	Cameron Highland
9.	268/341	99/06/01	DDCDBCCD	Ipoh/Cameron Highland
10.	269/343 /2	99/06/05	CDDBCBDD	Genting Highland
11.	270/342 /5	99/04/24	BCCCBBBB	Fraser Hill
12.	270/344/4	99/09/13	BCBCBCBC	MSC
13.	270/345	99/02/22	BACACADA	K. Sepang/P. D
14.	271/340	98/10/20	BBBBBBBBBB	T. Kenyir
15.	274/345	98/10/10	BABCBCBC	Endau-Rompin
16.	274/345/6	98/10/10	BCBCBDBD	Endau
17.	287/347	98/07/11	CBBBCBCC	Sarawak-Kalimantan
18.	288/347	99/07/24	BAAAAAAA	Kuching
19.	288/347	99/04/11	CCCCCC	Kuching
20.	290/345 /1	99/07/03	CCCCBCAB	K. Paloh
21.	290/346 /1	99/07/03	AAAAAAAB	K. Rajang
22.	291/345/5	99/07/31	CCBBBBBB	Sibu
23.	293/334	98/12/02	DDBBBBCB	P. Siput
24.	293/343/8	98/03/23	BAAABADB	Bintulu
25.	294/334	98/07/22	CDDDDDDD	P. Peninjau
26.	296/339/2	98/12/30	BBBBBBBB	P. Labuan
27.	297/339	98/10/24	BBBBCBDB	T. Kimanis
28.	298/338	98/10/24	BDBCBBBB	Kundasang
29.	298/339	98/10/24	BBBBBBBB	Sunsuron
30.	298/341	98/06/29	BCBDBDBD	Sarawak-Kalimantan
31.	298/342	98/06/29	BDBCBBBC	Sarawak-Kalimantan
32.	298/343	98/06/29	BCBBCBC	Sarawak-Kalimantan
33.	299/335/3	99/09/20	CABBCBCA	Tg. Siagut
34.	300/338	98/07/21	CABABBCB	Sigindai
35.	301/337	99/07/15	CACABBCB	Tg. Sugut
36.	302/338/3	99/09/15	AAAAABCB	Sandakan
37.	302/339	98/11/22	DDBBBBBD	Lamag
38.	302/339/8	98/11/22	BBBCBCCD	T. Lahad Datu

**Senarai data SPOT**  
**SPOT data list**

**SPOT 4**

No.	K/J	Date of Acq.	Cloud %	Location
1.	266/339/1	99/01/08	-	P. Pinang
2.	267/339	99/02/20	-	Gerik
3.	271/339	99/04/28	BBBBBBBBBB	Kg. Rahmat
4.	271/340	99/04/28	BBBBBBBBBB	T. Kenyir
5.	273/344	99/04/24	BBBBBBBBBB	Kuala Rompin
6.	298/338	99/08/08	AAAAABAC	Kota Kinabalu

**SPOT PANCHROMATIC**

No.	K/J	Date of Acq.	Cloud %	Location
1.	266/337/9	99/02/15	BBBBCBBCB	Nami
2.	267/341 /3	99/04/20	CBBBBCBBCB	Sitiawan/Gopeng
3.	267/342	99/04/20	CBCBCBCB	Bagan Datok
4.	269/341	99/05/27	BDBDBDBD	Cameron Highland
5.	270/343/3	99/04/24	BBBBCBCC	Genting Highland
6.	270/344	99/09/13	CCCCBBBB	K.L/ KLIA
7.	293/334	99/03/23	CDDDCDCD	P.Siput
8.	294/334	98/02/04	CABACABA	P.Peninjau
9.	295/330/1	99/01/08	EDDDDDDD	Sparsly (Mischief Reef)
10.	297/344 /1	99/04/27	BABBBBBA	Long Taan
11.	297/345	99/04/27	ABBCBCCC	Sarawak-Kalimantan

**Cloud Cover % :**

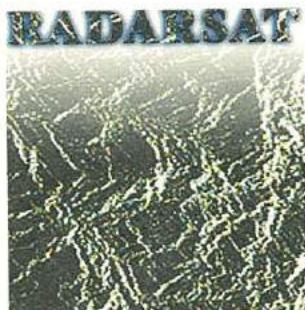
Each scene is being divided into octants : 1 - 8

Q1	Q2
Q3	Q4
Q5	Q6
Q7	Q8

Letters A - E correspond to cloud percentages :

A = 0%  
 B = 0-10%  
 C = 11-25%  
 D = 26-75%  
 E = > 76%

**Senarai data Radarsat**  
**Radarsat data list**



Sumber: Spot Asia, Singapura  
**Source : Spot Asia, Singapore**

Tahap pemprosesan : *Path Image Product*  
 Processing Level : *Path Image Product*

Area	Mode/Heading	Acq. Date
West Malaysia	ScanSAR Wide	29/11/98
East Malaysia	ScanSAR Wide	29/08/99 01/09/99 04/09/99 07/09/99
Sarawak State	Wide/Descending	17/08/99-06/09/99
Johor State	Wide/Descending	30/06/98 29/08/99
Inland Sabah	Standard/Descending	28/08/99-19/09/99
Kedah	Standard (S7)	10/10/99 03/11/99 27/11/99 14/01/2000 07/02/2000
Trengganu	Fine (F2)	31/10/99 23/11/99 17/12/99
	Standard (S1)	21/11/99
Kota Bharu (Flood Data)	Standard 7 Wide 2 Standard 2 Extended High 3 Fine 1 Standard 7 Wide 3 Standard 1 Extended High 6 Extended High 6 Fine 5 Fine 3 Standard 6 Extended High 6 Extended High 4	22/12/98 23/12/98 25/12/98 29/12/98 01/01/99 09/12/98 16/12/98 18/12/98 19/12/98 19/12/98 02/01/99 08/01/99 09/01/99 12/01/99 07/12/99
Kuantan (Flood Data)	Standard (S7)	09/01/99

*MACRES sedang berusaha untuk menjadi pusat rujukan bagi maklumat remote sensing dan sedang menubuhkan satu Pusat Maklumat Remote Sensing Nasional untuk memberi perkhidmatan secara online kepada penggunanya.*

*MACRES has initiated efforts to become a reference centre for remote sensing information and is now planning to establish a National Remote Sensing Information Centre to cater online services for its users.*

## **Perkhidmatan Maklumat dan Aktiviti Promosi**

### **Perkhidmatan maklumat**

MACRES telah memulakan pelaksanaan projek Jaringan Komunikasi Data Remote Sensing pada tahun ini. Projek yang melibatkan perbelanjaan sebanyak RM600,000 ini merupakan satu perkhidmatan maklumat yang membolehkan pengguna mengakses pelbagai bidang maklumat teknologi remote sensing dan teknologi berkaitan seperti sistem maklumat geografi (GIS), sistem posisi global (GPS) termasuk arkib data remote sensing MACRES.

Sebagai langkah pertama, MACRES telah memperolehi satu perisian aplikasi perpustakaan, iaitu ILMU (Integrated Library Management Utility) bagi menggantikan sistem perkhidmatan perpustakaan manual yang sedia ada. ILMU dapat meningkatkan sistem pengurusan dan perkhidmatan perpustakaan MACRES selaras dengan objektif MACRES untuk mengwujudkan sebuah perpustakaan elektronik bagi pengguna teknologi remote sensing. Sistem berkomputer ini juga dapat mewujudkan satu jaringan secara *online* di antara perpustakaan MACRES dengan agensi pengguna di dalam negara.

## **Information Services and Promotional Activities**

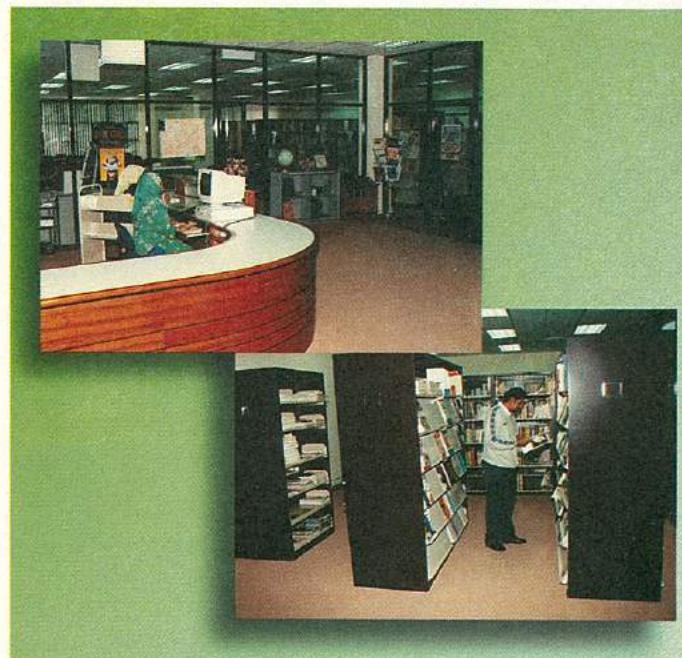
### **Information services**

MACRES began to initiate the implementation of its Remote Sensing Data Communication Network project this year. The project, which cost RM600,000, is an information service that provides online access to information on remote sensing and related technologies such as geographic information system (GIS), global positioning system (GPS) and MACRES remote sensing data archives.

As an initial effort, MACRES acquired a library application software i.e. ILMU (Integrated Library Management Utility) to replace the current manual library system. ILMU will be able to upgrade the library housekeeping and services system in line with MACRES objective to establish an electronic library for its users. This computerised system would also create an online link between MACRES library and local user agencies.

*Perpustakaan di ibu pejabat baru MACRES.*

*Library at MACRES new headquarters.*



Selain dari bahan-bahan rujukan, MACRES turut menyediakan maklumat terkini tentang fungsi dan aktiviti-aktiviti yang berlaku di sepanjang tahun dalam laman webnya. Laman web ini boleh dikunjungi dialamat <http://www.macres.gov.my> Maklumat yang terkandung akan dikemaskini dari masa kesmasa bagi kepentingan pengunjung.

Besides these reference materials, MACRES also provide current information on MACRES functions and yearly activities through its homepage. This web-site could be visited at <http://www.macres.gov.my> Information will be updated from time to time to ensure that visitors are informed with current information and latest news.

#### Aktiviti Promosi Teknologi/Technology Promotion Activities



Pameran sempena Seminar "Dissemination of New Remote Sensing Methodology Through a Semi-expert System", pada 7-8 Jun 1999, di Hotel Crown Princess, Kuala Lumpur.

*Exhibition during the "Dissemination of New Remote Sensing Methodology Through a Semi-expert System" seminar, held on 7-8 June 1999, at Crown Princess Hotel, Kuala Lumpur.*

Sebagai satu lagi langkah untuk menggalakkan pembangunan teknologi remote sensing, MACRES telah mengambil bahagian dalam beberapa pameran tempatan. Peranan dan aktiviti MACRES telah ditonjolkan dalam pameran tersebut disamping membuat promosi maklumat projek penyelidikan dan hasil-hasil yang ditemui. MACRES berpeluang mengambil bahagian dalam lima pameran tahun ini.

As another measure to expedite development of remote sensing technology, MACRES participated in a number of local exhibitions. MACRES roles and activities were highlighted in these exhibitions besides promoting its research projects and their findings. MACRES participated in five local exhibitions this year.



Y.B. Timbalan Menteri Sains, Teknologi & Alam Sekitar di tapak pameran MACRES sempena "Seminar NAREM Pertama", pada 28 Jun 1999, di INTAN, Bukit Kiara.

*The Honourable Deputy Minister of Science, Technology & the Environment at MACRES exhibition booth during "First NAREM Seminar", held on 28 June 1999, at INTAN, Bukit Kiara.*



Pameran sempena Konferen MRSS Kedua pada 16-18 Mac 1999, di ITM Convention Centre, Shah Alam.

*Exhibition during the Second MRSS Conference, held on 16-18 March 1999, at ITM*

## Lawatan Ke MACRES / Visits To MACRES

Lawatan berbentuk teknikal dan bukan teknikal turut diadakan untuk memberi penerangan yang lebih terperinci tentang peranan MACRES dan keupayaan teknologi remote sensing bagi tujuan pembangunan negara. Sejumlah lapan lawatan telah berjaya diatur dalam tahun 1999.

Technical and non-technical visits were also arranged to give an insight of MACRES roles and the potential application of remote sensing technology in nation building. A total of eight visits were organised in 1999.

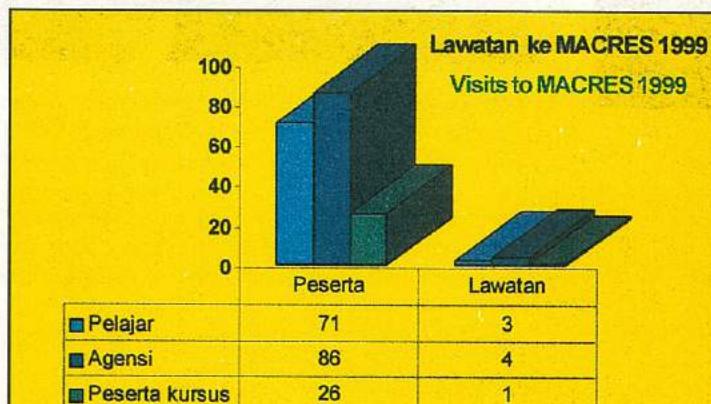
### Senarai pelawat 1999 / List of visitors 1999

Tarikh/date	Pelawat/visitors
25/02/99	Jabatan Perancangan Bandar dan Desa (25 orang)
17/02/99	Angkatan Tentera Malaysia (26 orang)
17/05/99	Sistem Pengawasan Laut, Lumut (38 orang)
09/08/99	Pelajar Pengurusan Sumber Tanah (20 orang)
21/08/99	Pelajar Kajian Sains, Ukur & Geomatik, ITM (17 orang)
24/09/99	Pelajar Kursus Remote Sensing, UTM (36 orang)
18/10/99	Jabatan Alam Sekitar (8 orang)
22/12/99	Bhg. Kemajuan W. Persekutuan & Perancangan Lembah Kelang, JPM (15 orang)



Lawatan Jabatan Perancangan Bandar dan Desa pada 25 Februari 1999

Visit by Town and Country Planning Department on 25 February 1999



## Aktiviti Antarabangsa

Sebagai sebuah pusat kecemerlangan teknologi remote sensing di Malaysia, MACRES sering dirujuk oleh agensi-agensi antarabangsa untuk mendapatkan pandangan dan maklumat lanjut dalam hal berkaitan dengan isu perkembangan remote sensing dalam negara. Penglibatan MACRES dalam aktiviti antarabangsa ialah bertujuan untuk mewujudkan kerjasama yang lebih erat sambil meningkatkan pemindahan teknologi dengan negara-negara yang telah maju dalam teknologi remote sensing dan teknologi yang berkaitan. Senarai aktiviti antarabangsa MACRES dalam tahun 1999 adalah seperti dalam jadual di bawah:

### International Activities

Being a centre of excellence in remote sensing technology in Malaysia, MACRES is often sought by other international agencies for its recommendations and information on issues pertaining to remote sensing development in the country. MACRES participation in international activities is aimed to foster closer cooperative relationship and at the same time to increase technology transfer from countries which are already established and advanced in these technologies. List of MACRES international activities is shown in the table below:

Bil./No.	Tarikh / Date	Aktiviti / Activities	Negara / Country
1	25-26/02/99	2nd Meeting of the Working groups on Sub-Regional Fire Fighting Arrangements (SRFA) for Sumatra and Borneo	Singapore
2	22-24/03/99	Global Observation Information Network Workshop (GOIN) '99	Hawaii
3	29-31/03/99	ASEAN-CANADA Workshop on Sustainable Management of Natural REsource & Coastal Environment	Bali,Indonesia
4	17-21/05/99	37th ASEAN-COST Meeting	Yangon,Myanmar
5	24-27/05/99	Asia-Pacific Regional Space Agency Forum (APRSAF-6)	Tokyo, Japan
6	07-11/06/99	Intergovernmental Consultative Meeting	Bangkok, Thailand
7	13-15/06/99	ASEAN-Australia Final Seminar	Vietnam
8	16-18/06/99	12th Meeting of ASEAN Experts Group on Remote Sensing (AEGRS)	Vietnam
9	25-27/08/99	The Meeting of Experimental Application of Future Communication/Broadcasting Satellite ETS-VII and GIGABIT	Tokyo, Japan
10	14-17/09/99	UN-CHINA-ESA Conference on Space Application for Sustainable Agriculture	Beijing,China
11	11-22/10/99	Training Program on Coastal Zone Monitoring and Management	Bangkok,Thailand
12	26/10-05/12/99	Training Course on Remote Sensing Technology (Advanced)	Japan
13	05-26/11/99	Job attachment	Holland
14	15-27/11/99	Job attachment	Vietnam
15	23-25/11/99	Asian Conference on Remote Sensing	Hong Kong
16	29/11-24/12/99	Attachment Training for Ground-based Scatterometer & Anaechoic Chamber	Texas, USA



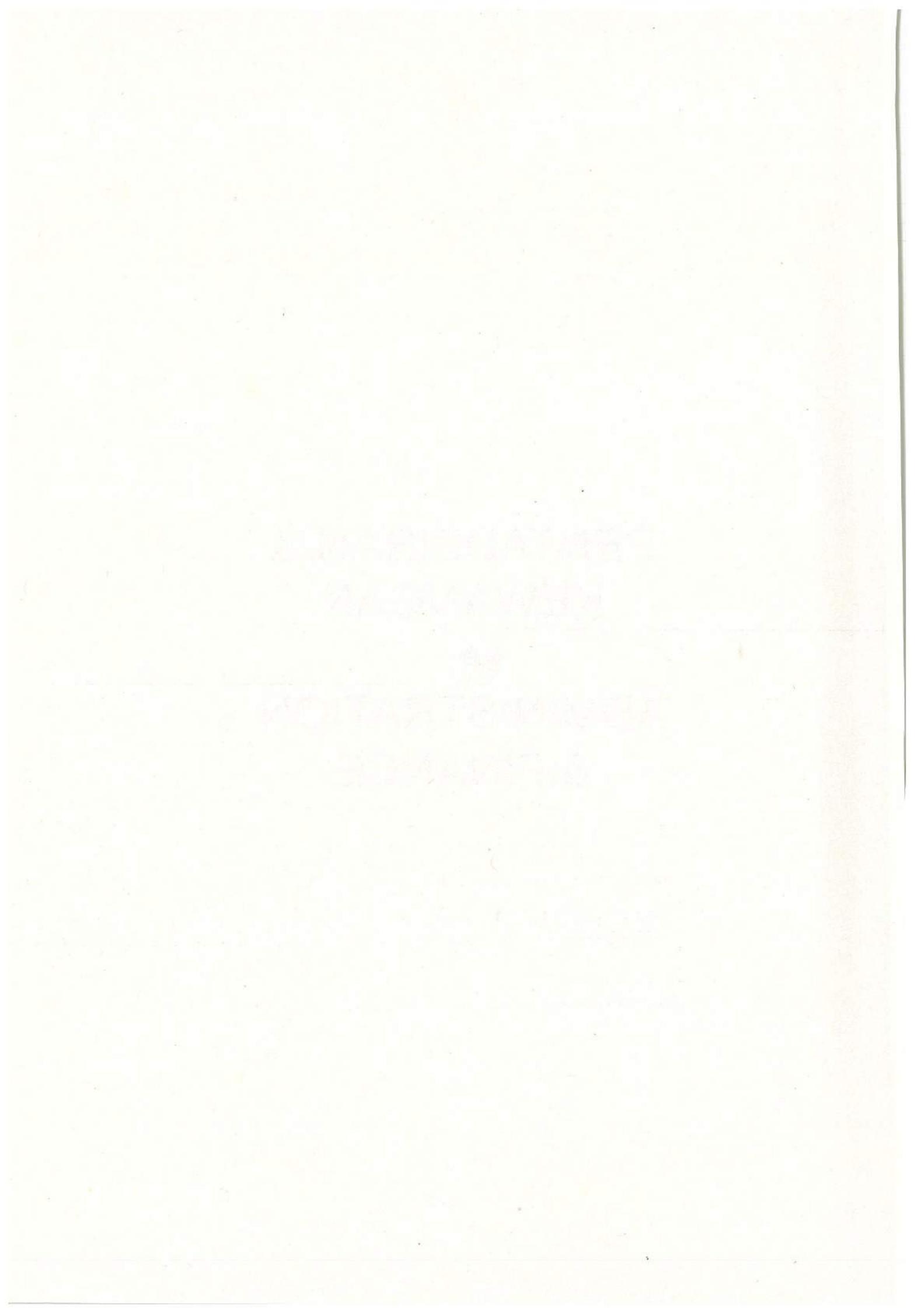
# PENTADBIRAN & KEWANGAN

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## ADMINISTRATION & FINANCE



## Pentadbiran dan Kewangan / Administration and Finance

Walaupun menghadapi kesulitan kekurangan tenaga kerja, Bahagian Pentadbiran dan Kewangan MACRES telah melaksanakan tanggungjawabnya dengan memuaskan bagi menyokong aktiviti yang dilaksanakan oleh bahagian-bahagian lain di MACRES. Pihak Jabatan Perkhidmatan Awam dan Perbendaharaan telah dihubungi mengenai situasi ini dan kebanyakan kekosongan jawatan yang sedia ada dijangka akan diisi dalam tahun 2000.

*Bahagian Pentadbiran  
dan Kewangan  
bertanggungjawab  
terhadap urusan  
kewangan dan  
pentadbiran MACRES.*

*The Administrative and  
Finance Division is  
responsible for  
MACRES financial and  
administrative matters.*

Kerja-kerja pentadbiran am dikendalikan oleh Bahagian Pentadbiran dan Kewangan. Walau bagaimanapun, memandangkan masalah kekurangan tenaga kerja, bahagian ini dibantu oleh Bahagian Perancangan dari segi penyelenggaraan umum dan Bahagian Data dan Informasi dalam bidang keselamatan pejabat. Perpindahan MACRES ke bangunan baru dan pertambahan dalam bilangan pegawai dan kakitangan telah menyebabkan beban kerja pentadbiran meningkat. Keadaan akan lebih mencabar lagi apabila bangunan stesen bumi MACRES di Temerloh dibuka, dimana Bahagian Pentadbiran dijangka menyokong dalam hal pentadbiran amnya.

Although handicapped by the staffing shortage, the Administrative and Finance Division managed to execute its responsibilities in supporting other MACRES activities. This situation was referred to The Public Service Department and the Federal Treasury and it is expected that most vacancies will be filled by the year 2000. MACRES general administrative activities is catered by the Administration and Finance Division. However, with a shortage in manpower, the division is aided by the Planning Division and the Data and Information Division in administrating general maintenance office security. With the occupancy of the new office building and increased staff strength, the general administrative workload has also increased. This will be even more challenging when MACRES ground station building in Temerloh is in operation , whereby its administrative activities will be supported by the Administrative and Finance Division.

### **Status Kakitangan**

Bilangan jawatan yang diluluskan untuk MACRES ialah 137 yang mana terdiri daripada 76 jawatan Kumpulan Pengurusan dan Profesional dan 61 jawatan Kumpulan Sokongan. Pada tahun 1999, status pengisian jawatan MACRES telah meningkat kepada 99 pengisian jawatan berbanding dengan hanya 87 pengisian jawatan dalam tahun sebelumnya.

Dengan adanya bilangan pegawai dari Kumpulan Pengurusan dan Profesional yang hampir penuh, MACRES menjangka program penyelidikannya bagi tahun 2000 akan berjalan dengan lebih lancar dan prestasinya bertambah menyerlah. MACRES juga sedang dalam urusan untuk mendapatkan penambahan jawatan di bawah cadangan penyusunan semula carta MACRES.

Kumpulan /Group	Jawatan/posts	1998	1999
Pengurusan dan Profesional Management and Profesional	76	54	69
Sokongan /Supporting	61	33	30
<b>JUMLAH/TOTAL</b>	<b>137</b>	<b>87</b>	<b>99</b>

### **Staffing Status**

MACRES was given approval to 137 posts, whereby 76 are for the Managerial and Professional category and the remaining 61 are for supporting staff . In 1999 MACRES staffing was increased to 99 filled posts when compared to only 87 during the former year. With the recruitment of almost all Managerial and Professional posts, MACRES is expecting to implement more efficient and productive research programmes for the year 2000. MACRES is also in the process of acquiring additional posts under its organisational restructuring exercise.

## Kewangan

Prestasi MACRES dalam Perbelanjaan Mengurus mencapai 87.2% atau RM 4,314,019.02 daripada jumlah peruntukan yang diluluskan, iaitu sebanyak RM 4,948,700.00. Penangguhan MACRES dalam proses perpindahannya ke bangunan baru pada 1 Julai 1999 dan penjimatan kos perpindahan serta kerja-kerja pemulihan semula pejabat lama telah menyebabkan kecacatan dalam keupayaan perbelanjaan.

Dari segi Perbelanjaan Pembangunan, MACRES telah diperuntukan sebanyak RM 66.81 juta pada tahun 1999. Walau bagaimanapun dengan mengamalkan kawalan kewangan yang ketat yang mementingkan keupayaan dan keberkesanan perbelanjaan, MACRES telah mengembalikan RM 24.81 juta kepada pihak Kementerian untuk diagih-agihkan kepada agensi-agensi lain. Hasilnya, prestasi Perbelanjaan Pembangunan MACRES dalam 1999 telah mencapai 99.76% atau RM 41,901,351.40 dari jumlah peruntukan (diubahsuai) yang diluluskan iaitu RM 42,001,000 (Sila rujuk jadual). Prestasi keseluruhan perbelanjaan MACRES bagi Peruntukan Mengurus dan Peruntukan Pembangunan ialah 98.45% atau RM 46,215,370.42 daripada jumlah keseluruhan sebanyak RM 46,949 ,700.

## Finance

MACRES financial performance in its Operating Expenditure achieved 87.2% or RM 4,314,019.02 of the total approved allocation of RM 4,948,700.00. A delay in the occupancy of the new office building in 1 July 1999 and constraints in the moving and reinstatement costs have resulted in a substantial amount of savings and thus the "short fall" in expenditure.

As for Development Expenditure, MACRES was allocated a sum of RM 66.81 million for the year 1999. However, with a strict control on expenditure, and giving priority to spending capability and effectiveness, MACRES returned a sum of RM 24.81 million to the Ministry to channel the excess funds to the other agencies. As a result, MACRES Development Expenditure performance in 1999 was 99.76% or RM 41,901,351.40 of the total allocation of RM 42,001,000. MACRES overall performance Operating and Development Expenditure for 1999 was 98.45% or RM 46,215,370.42 of the total combined allocation of RM 46,949 ,700.

**Peruntukan dan Perbelanjaan 1999**  
**Allocation and Expenditure 1999**

Peruntukan Allocation	Lulus (RM) Approved (RM)	Ubahsuai Reviewed	Belanja Spent	% Belanja % Spent
Mengurus <i>Operating</i>	4,948,700	4,948,700	4,314,019	87.18
Pembangunan <i>Development</i>	66,811,000	42,001,000	41,901,351	99.53
<b>JUMLAH TOTAL</b>	<b>71,759,700</b>	<b>46,469,700</b>	<b>46,215,370</b>	<b>99.45</b>

### Hasil

Kutipan hasil MACRES bagi tahun 1999 meningkat dengan mendadak sebanyak 313.29%, iaitu kepada RM311,259.00. Punca utama dalam peningkatan hasil ini ialah kutipan bagi tunggakan dalam tahun 1998 yang hanya dibayar pada tahun 1999 dan juga pertambahan dalam pembelian data remote sensing satelit oleh agensi-agensi pengguna awam dan swasta. Sumbangan/hasil juga diterima daripada agensi-agensi atau badan-badan lain bagi projek-projek khusus seperti IRPA dan INDFORSUS yang disimpan di bawah Akaun Amanah, tetapi nilai ini tidak dimasukkan kedalam akaun di atas.

### Revenue

MACRES revenue in 1999 increased substantially by 313.29%, i.e. amounting to RM311,259.00. The main reasons for this increase was the collection of outstanding arrears from 1998???. At the same time, income also increased as a result of the increase demand for remote sensing data. Excluded from the above accounts are grants/income received from other agencies or organisations for specific projects such as IRPA and INDFORSUS which are held under the Trust Account.

### Hasil 1999 Revenue 1999

Akaun/Account	1998	1999
Amanah/ <i>Trust</i>	RM 47,806	RM 42,500
Hasil <i>Revenue</i>	RM 51,545	RM268,759
<b>JUMLAH/TOTAL</b>	<b>RM 99,351</b>	<b>RM 311,259</b>

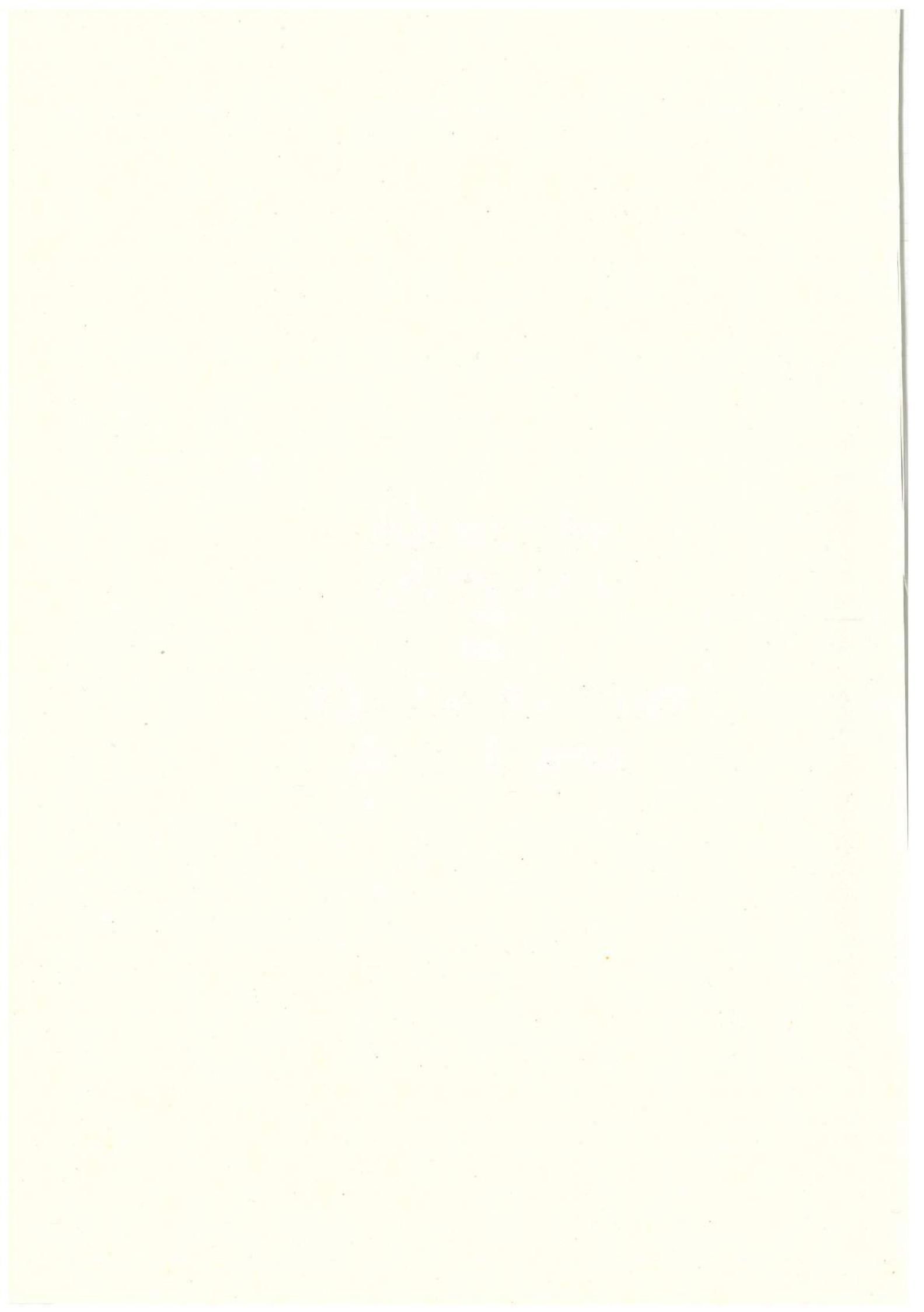
# PETUNJUK PRESTASI

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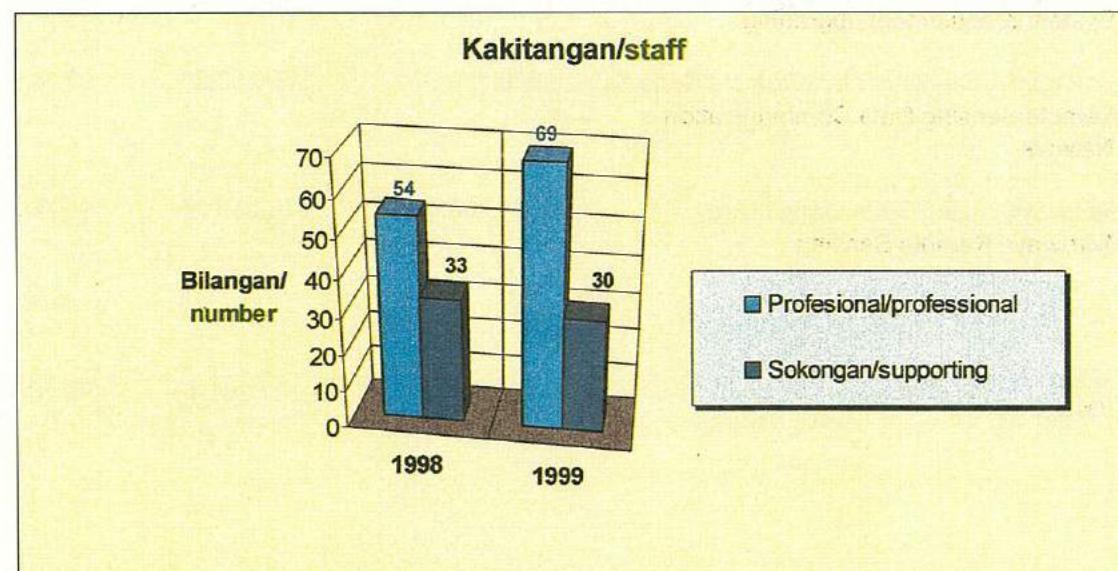
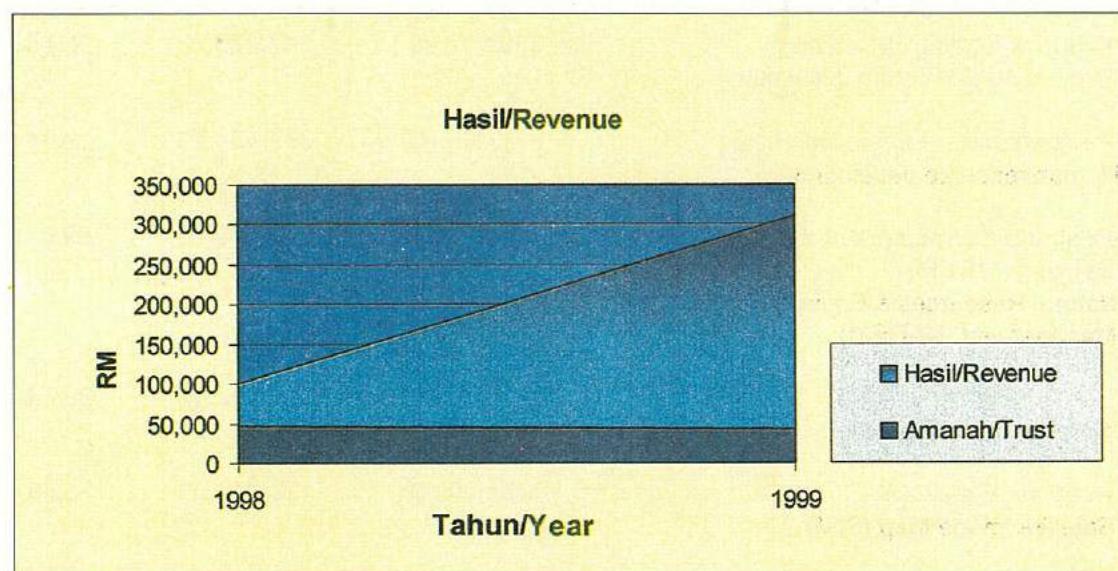
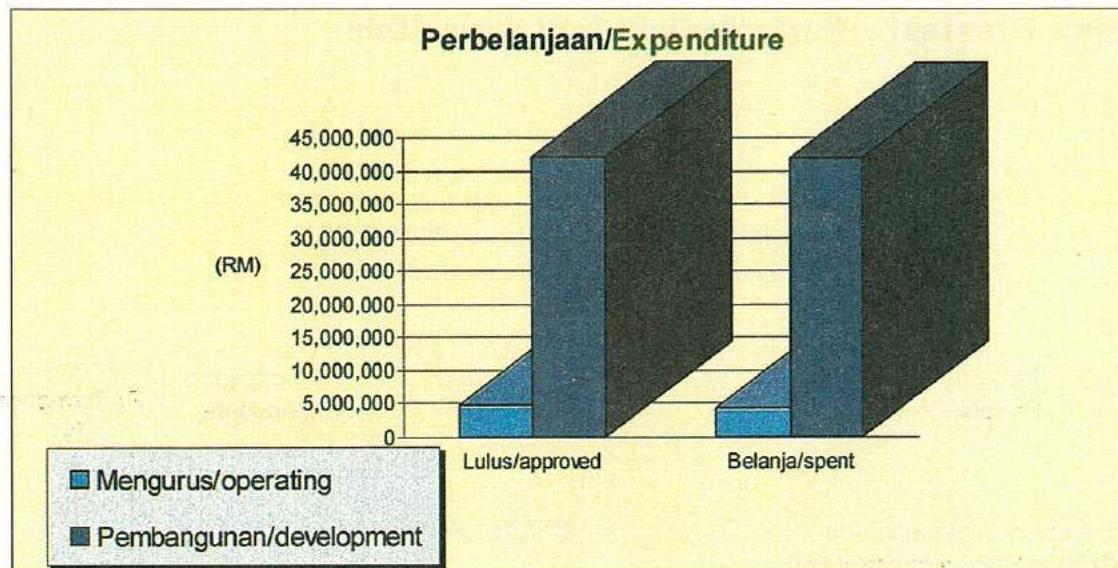
## PERFORMANCE INDICATORS

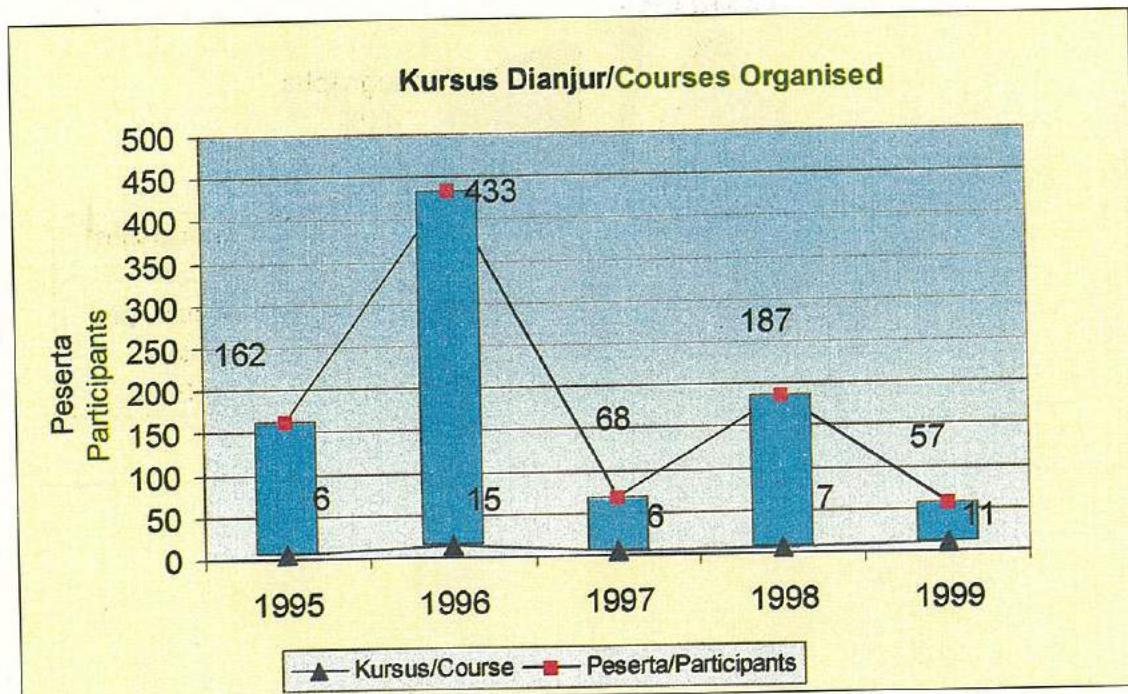
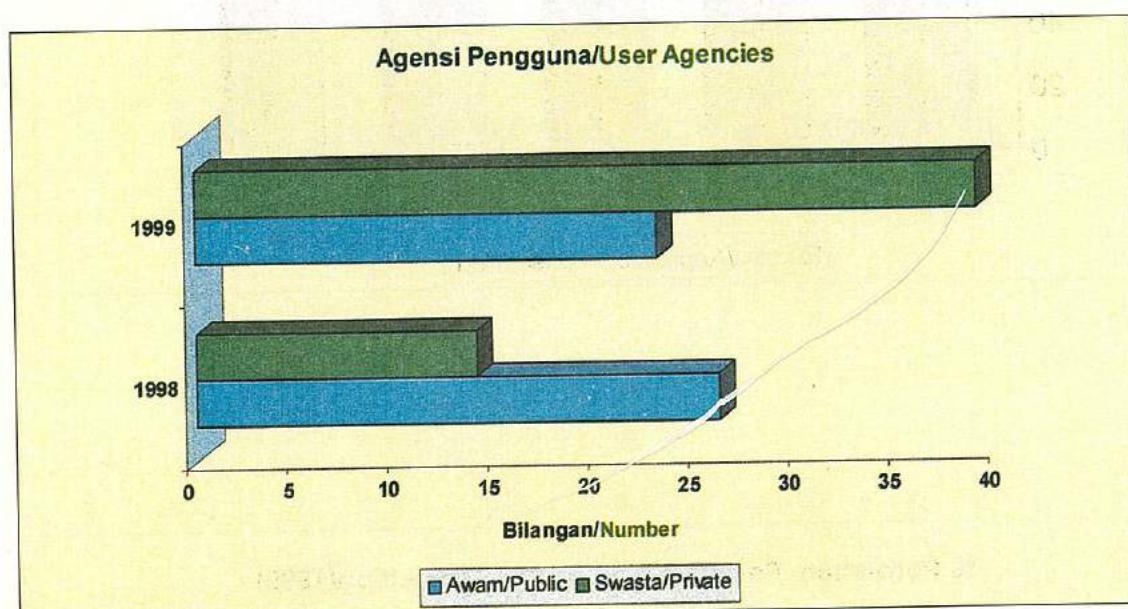
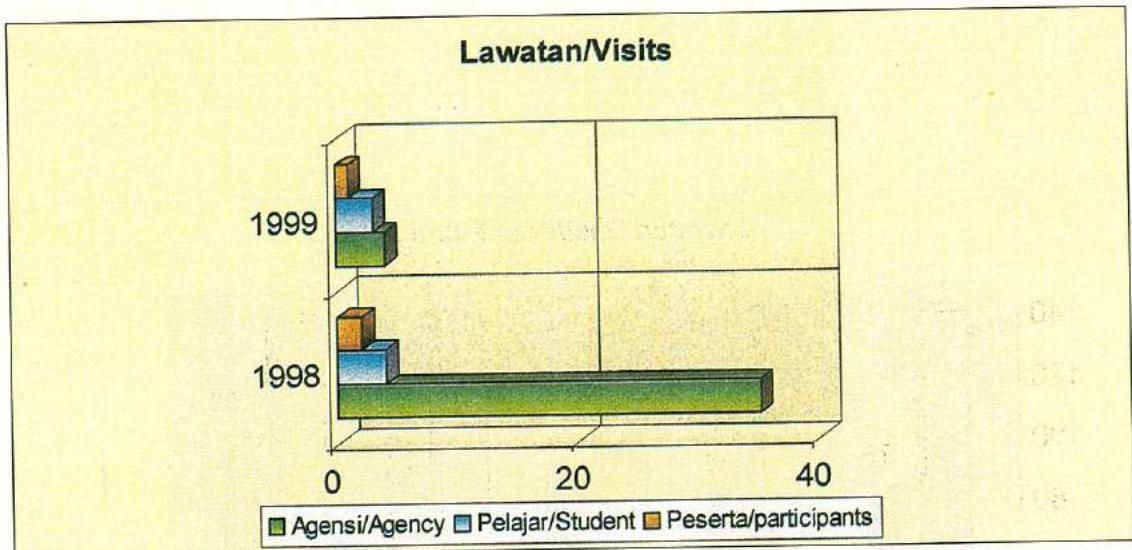


## Petunjuk Prestasi / Performance Indicator 1999

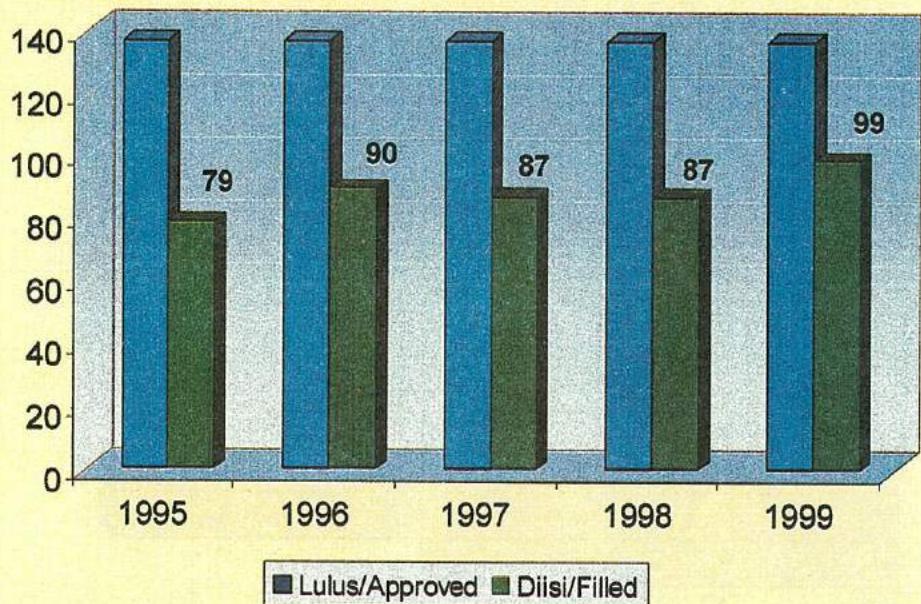
### Perbelanjaan Pembangunan MACRES MACRES Development Expenditures

Projek Project	Peruntukan Allocation	Perbelanjaan Expenditure	Prestasi Performance %
1. Pembinaan stesen bumi <b>Ground Station construction</b>	27,720,000.00	27,716,606.15	99.99
2. Bangunan baru MACRES <b>MACRES new building</b>	3,640,000.00	3,613,659.55	99.28
3. Kajian perunding stesen bumi <b>Ground station consultancy study</b>	360,000.00	347,328.23	96.48
4. Pembangunan tenaga manusia <b>Human resource development</b>	371,000.00	370,424.70	99.84
5. Pengurusan Sumber Asli & Alam Sekitar (NAREM) <b>Natural Resources &amp; Environmental Management (NAREM)</b>	1,344,000.00	1,339,590.73	99.67
6. Perolehan data satelit <b>Satellite data acquisition</b>	1,430,000.00	1,426,582.44	99.76
7. Peta Imej Satelit (SIM) <b>Satellite Image Map (SIM)</b>	140,000.00	138,246.49	98.75
8. Sistem keselamatan <b>Security system</b>	3,800,000.00	3,772,703.58	99.28
9. Peningkatan sistem & peralatan <b>System &amp; equipment upgrading</b>	2,435,000	2,429,959.16	99.79
10. Jaringan Komunikasi Data Remote Sensing <b>Remote Sensing Data Communication Network</b>	380,000.00	369,885.00	97.34
11. Remote Sensing Gelombang Mikro <b>Microwave Remote Sensing</b>	381,000.00	376,365.37	98.78
Jumlah keseluruhan <b>Overall</b>	42,001,000.00	41,901,351.40	99.76

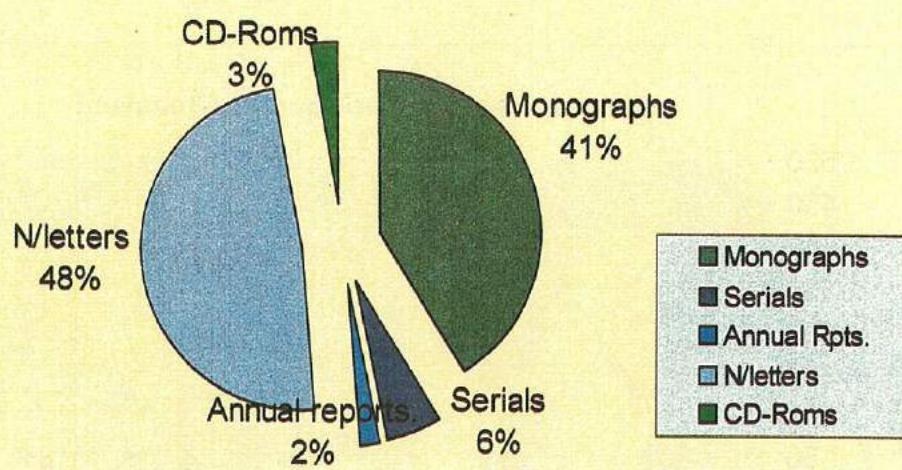




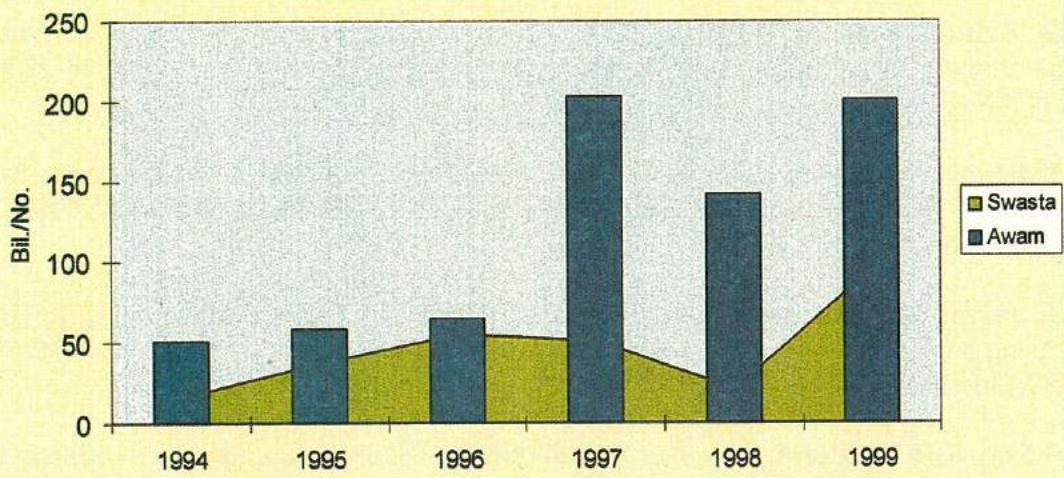
Jawatan Diisi/Post Filled



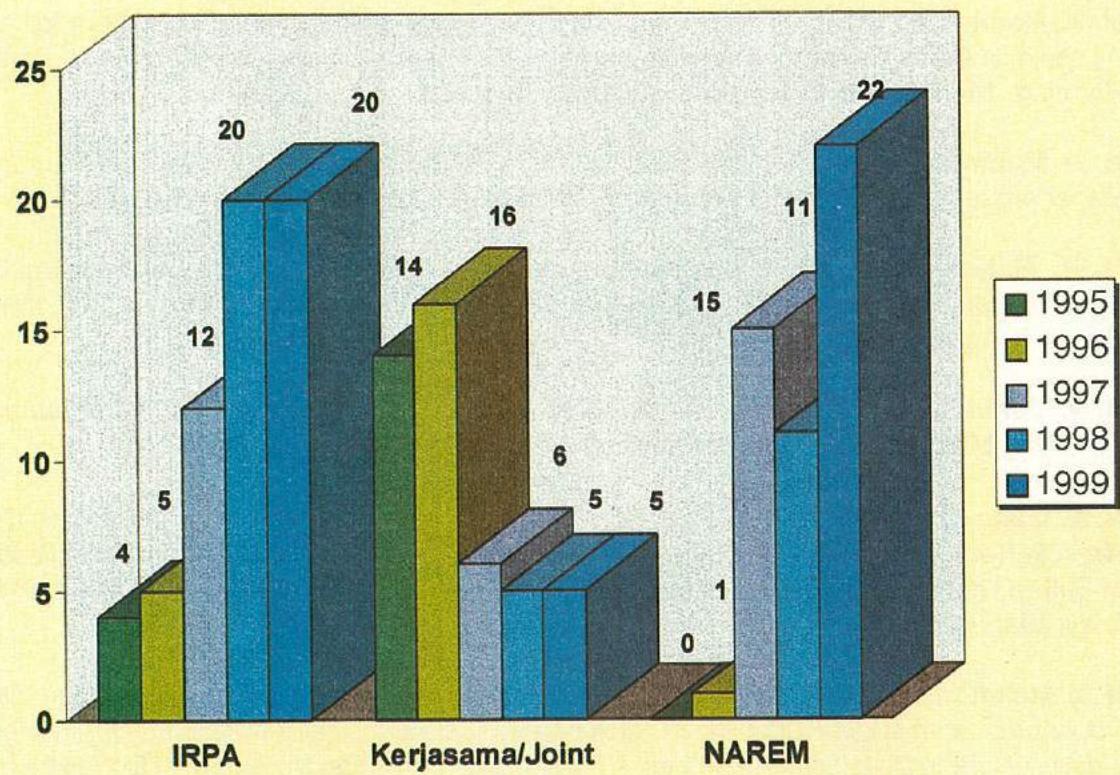
% Perolehan Perpustakan/Library Acquisition(1999)



**Bilangan Scene Data Satelit Yang Dipohon Mengikut Sektor Pengguna/Number of Satellite Data Scenes Requested With Respect to User Segments**



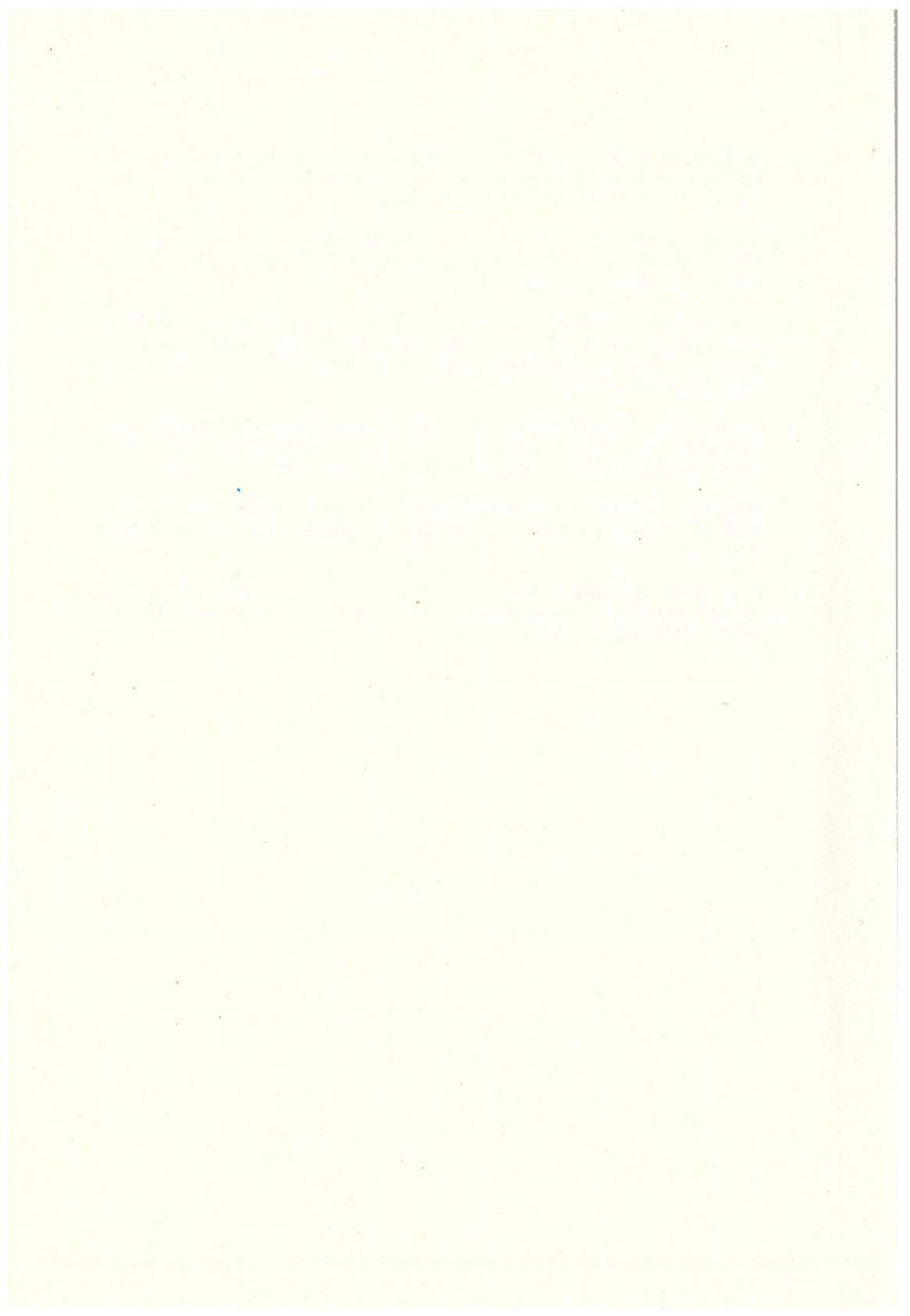
**Projek Penyelidikan/Research Projects**



**Senarai artikel-artikel yang telah diterbit dan dibentangkan oleh MACRES dalam 1999**  
**List of articles published and presented by MACRES in 1999**

1. **A.B. Saiful Bahari, Y. Safiah, H.T. Chuah, H.T. Ewe** (1999). "Rice Monitoring Using Radarsat SAR Data". Paper presented at the Second Malaysian Remote Sensing Society Conference on Remote Sensing and GIS, 16-18 March 1999, ITM Convention Centre, Shah Alam, Selangor.
2. **A.B. Saiful Bahari, H.T. Chuah** (1999). "Airsar/Topsar Pacrim Program - A Malaysian Experience". Paper presented at Airsar Pacrim Significant Results Workshop, 24-26 August 1999, Maui, Hawaii.
3. **A.T. Jasmi** (1999). "Pemetaan Zon Bahaya Tanah Runtuh Dengan Kaedah Remote Sensing dan GIS". Paper presented at Ceramah Teknik Jabatan Geologi, 18 August 1999, UKM, Bangi, Selangor.
4. **A.T. Jasmi, N. Azlikamil** (1999). "Landslide Hazard Zonation Mapping Using Remote Sensing and GIS Techniques". Paper presented at '99 Geological Conference, 29-30 May 1999, Desaru, Johor.
5. **K.F. Loh, K.R. Ku Mohd. Noh, A.B. Saiful** (1999). "Rice Monitoring Using Radarsat Data". Paper presented at the Second Malaysian Remote Sensing Society Conference on Remote Sensing and GIS, 16-18 March 1999, ITM Convention Centre, Shah Alam, Selangor.
6. **K.F. Loh, H. Mariamni, H. Faizu** (1999). "Natural Resources and Environmental Management - A Case of Interactive Agriculture Landuse Planning". Paper presented at the Second Malaysian Remote Sensing Society Conference on Remote Sensing and GIS, 16-18 March 1999, ITM Convention Centre, Shah Alam, Selangor.
7. **N. N. Mahmood** (1999). "Remote Sensing and Geographic Information System for Agriculture Advancement". Paper presented at National Conference Engineering Smart Farming, 14-16 March 1999, UPM Serdang, Selangor.
8. **N. N. Mahmood** (1999). "Operationalisation of a Total Forest Fire Management Plan". Paper presented at GOIN '99 Workshop, 24-26 March 1999, Honolulu, Hawaii.
9. **N. N. Mahmood** (1999). "Conservation of Earth Environment - Space Infrastructure Development Challenges". Paper presented at Sixth Session of Asia-Pacific Regional Space Agency Forum(APRSAF-6), 24-27 May 1999, Tokyo, Japan.
10. **N. N. Mahmood** (1999). "Satellite Image Map Production In Malaysia". Paper presented at The 1999 Malaysian Survey Congress, 18-19 June, Kuala Lumpur.
11. **N. N. Mahmood** (1999). "Forest Fire Early Warning System and damage Assessment Using Remote Sensing Satellite Data". Paper presented at The Meeting of Experimental Applications of Future Communication/Broadcasting ETX-VIII Program and Gigabit, 25-27 August 1999, Tokyo, Japan.
12. **N. N. Mahmood** (1999). "Earth Observation for Environmental and Ecological Sustainability". Paper presented at UN-ESCAP/ISRO Science Symposium, Space Technology for Improving Quality of Life in Developing Countries: A Perspective for the Next Millenium, 15-17 November 1999, New Delhi, India.

13. **N. N. Mahmood**(1999). "Total Forest Fire Management Plan". Paper presented at UN-ESCAP/ISRO Workshop on Space Technology for Improving Quality of Life in the New Millenium, 18-20 November 1999, New Delhi, India.
14. **N. N. Mahmood**(1999). "Total Forest Fire Management Plan". Paper presented at UN-ESCAP/ISRO Workshop on Space Technology for Improving Quality of Life in the New Millenium, 18-20 November 1999, New Delhi, India.
15. **N. Azlikamil, B. Abd. Rashid, A.T. Jasmi**(1999). "Groundwater Zone Prediction Using Integrations of Remote Sensing and GIS - Case Study in Hulu Langat Area". Paper presented at the Second Malaysian Remote Sensing and GIS Conference, 16-18 March 1999, Shah Alam, Selangor.
16. **N.Laili, H.Mariamni, K.R. Ku Mohd. Noh**(1999). "Landuse/landcover Classification Using Multi-polarised and Multi-frequency SAR Data". Paper presented at the Second Malaysian Remote Sensing and GIS Conference, 16-18 March 1999, Shah Alam, Selangor.
17. **S.Mardiana,K. Osman, A. Azman, B. Jimat** (1999). "Remote Sensing in Flood Studies ". Paper presented at Seminar on Remote Sensing & Related Technologies for Water Resources, 27 September 1999, Kuching, Sarawak.
18. **S. Mardiana, A.B. Jasmi**(1999). "Assessment of the Use of Airsar Data in Road Rehabilitation Projects". Paper presented at Seminar on MACRES Co-ordinated IRPA Projects, 21 December 1999, Kuala Lumpur.









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