

# **Australian Agency Regional Activities in Space Applications.**

**Statement on behalf of  
CSIRO (Australia) by David L B Jupp  
and  
Cooperative Research Centre for Satellite Systems by Jeff Kingwell and  
Steve Suehamu**

**Including comments of the Surveying and Land Information Group and Bureau  
of Meteorology**

## **1. Introduction**

In the five years since the First Ministerial conference on Space applications for Sustainable Development in Asia and the Pacific in Beijing (September 1994) Australia has played an increasingly active role in the development of applications of space technology in the region, particularly in applications to issues of sustainable development. Australian space organisations will continue to support the efforts of the ESCAP RESAP program in the Asia-Pacific Region that will help ensure maximum benefit and effectiveness in the many relevant projects and programs that are occurring here.

Australian agency officials present for the Senior Officials Meeting of the second Ministerial Meeting have participated in the development review and modification of the draft documents and believe that the revised documents represent an effective plan for future RESAP activities and take into account the views of the agencies listed.

They will recommend that the RESAP-II program as outlined in the Action Plan and the declarations of the Ministerial Statement be actively supported by the Australian government in the coming years.

## **A brief outline of Space and space data related activities in Australia**

Australia conducts significant space activity as is outlined in the attached reports to the UNISPACE III forum<sup>1</sup> and to the recent CEOS meeting in Stockholm<sup>2</sup> and is an active member of international groups such as CEOS, WMO and APN. Australia's response to the challenges articulated in the Beijing declaration has occurred on a number of fronts. These include development, research, training and operational applications in fields such as communications; Earth observation; meteorology; positioning; space science and technology; and spatial data infrastructure. One example of immediate practical benefit is Australian involvement in regional agricultural projects which use Earth observation and are directly tackling issues of sustainability. Sustainability may be helped from space but must, in the end, be achieved on the ground.

Selected activities are as follows:

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<sup>1</sup> UNISPACE III report of Australia on national space activities in 1999, ISR

<sup>2</sup> CEOS Plenary 1999. Member Report on behalf of Australia by CSIRO. By Graham Harris Chief, CSIRO Land & Water & Head, CSIRO Office of Space Science & Applications.

## **2. Involvement in RESAP**

Australia has maintained activity in all of the Regional Working Groups and participated to a significant level in most of them, as well as the ICC and the Regional Information Network. Several agencies have supported RESAP programs through the time of scientists and experts, including several medium-term secondments.. These include AUSLIG, the Australian Bureau of Meteorology, the Cooperative Research Centre for Satellite Systems and CSIRO.

Australian experts have participated closely in the preparation of the first and second Ministerial conferences, and in a detailed study of regional small satellite programs and projects, performed by ESCAP with support from the government of the Republic of Korea.

Australian agencies have entered into a number of bilateral cooperative agreements since the First Ministerial Conference. These have been framed in the context of broader regional cooperation as demonstrated by RESAP.

## **3. Regional Working Groups**

General contact and focus point:

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The current Australian Working Group Contacts are as follows:

<b>Working Group</b>	<b>WG Contact persons</b>
Remote Sensing, GIS and Satellite based Positioning	Primary Dr David Jupp (CSIRO COSSA/EOC)  Secondary Paul Tresize (AUSLIG)
Meteorological Satellite Applications and Natural hazards Monitoring	Primary Dr David Griersmith (BoM)  Secondary TBA
Satellite Communication Applications	Primary Professor Steve Suehamu (Cooperative Research Centre for Satellite Systems)  Secondary Professor Michael Miller (Cooperative Research Centre for Satellite Systems)
Space Sciences & Technology Applications	Primary: Dr Brian Embleton (Cooperative Research Centre for Satellite Systems) Secondary Dr Dave Jauncey (CSIRO ATNF)

The contact for the Regional Information Network is Jeff Kingwell, Cooperative Research Centre for Satellite Systems.

Australian researchers have benefited from active participation in RESAP Working Group projects. In particular, under the Common Simple Payload concept of the Space Science and Technology Applications WG, Australian Singaporean and Korean satellite technologists are moving towards practical joint projects in which total project costs can be decreased by devising standard communication packages for regional space missions.

Through a recent resolution of the Satellite Communication Applications Working Group, Australia's preparations for its *FedSat* research and education satellite have been assisted. The WG agreed to adopt a policy of mutual support for radio spectrum coordination for regional small satellite missions.

Australian organizations have benefited from close ties with other regional space organizations, which have been created or strengthened through joint activities in the RESAP Working Groups and other ESCAP forums. Already, several projects have been proposed as a result of Announcements of Opportunity that have been made at the WG.

#### **4. Cooperative Research Centre for Satellite Systems**

The Cooperative Research Centre for Satellite Systems was established as a multi-site joint venture comprising six universities, five private companies and two government agencies. In less than two years, the Centre has enrolled fifty PhD and Masters students and hopes to become a regional focus for training in space science and technology. The CRCSS has been cited in ESCAP publications as a leading example of collaboration between the academic, industrial and public sectors in the region. The Centre's first satellite project has already commenced and is expected to be launched in about 12 months.

The CRCSS or its individual joint venture participants have entered or are concluding agreements with counterpart agencies in Japan, Republic of Korea and Singapore.

#### **5. CEOS**

The Committee on Earth Observation Satellites (CEOS) was created in 1984. CEOS has since established a broad framework for co-ordination across all space-borne Earth observation missions.

CEOS has three primary objectives:

- to optimize the benefits of space-borne Earth observations through co-operation of its Members in mission planning and in the development of compatible data products, formats, services, applications, and policies;
- to aid both its Members and the international user community by, inter alia, serving as the focal point for international co-ordination of space-related Earth observation activities, including those related to global change;
- to exchange policy and technical information to encourage complementarity and compatibility among space-borne Earth observation systems currently in service or being developed, and the data received from them; issues of common interest across the spectrum of Earth observation satellite missions will be addressed.

Individual members of CEOS use their best efforts to implement CEOS recommendations in their respective Earth observation programmes.

CSIRO (Australia) is a Member of CEOS as are India, China and Japan from our region. New Zealand is an Associate. ESCAP is an Associate Member of CEOS and all of its regional Members have been working to maximise the benefits flowing to the Asia Pacific

region from the activities of the CEOS Plenary, its Working Groups and the CEOS role in the IGOS partnership. It is clear that the growing activity and accomplishment in the region should lead to greater involvement of regional countries in this important forum.

## **6. Involvement in PCGIAP**

Australia has placed great importance on regional spatial data initiatives as a coordinated and global — as well as regional — activity.

The United Nations Regional Cartographic Conference for Asia and the Pacific (UNRCC-AP) in Beijing 1994 established the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP).

PCGIAP s aims are to:

- Develop a regional spatial data infrastructure
- Contribute to the global infrastructure model
- Assist member countries with SDI development.

Mr Drew Clarke, Australia, is Secretary of the PCGIAP and AUSLIG manages the PCGIAP Secretariat. Malaysia is PCGIAP President and China is the Vice-President.

PCGIAP has close liaison arrangements with regional and global spatial data bodies. It conducts its business through four operational areas :

### **1. Executive / Secretariat**

Institutional and policy matters including definition of the Asia-Pacific Spatial Data Infrastructure (APSDI).

### **2. Regional Geodetic Network Working Group**

Implementing a regional precise geodetic network, developing regional horizontal and vertical geodetic datums.

### **3. Regional Fundamental Data Working Group**

Developing a policy for sharing regional fundamental data, defining and facilitating integration of regional fundamental datasets, establishing a regional network of data nodes (directories), and promoting applications of spatial data.

### **4. Development Needs Taskforce**

Addressing members SDI related needs through development projects and funding support.

## ***Regional cooperation***

PCGIAP has a policy of keeping ESCAP RESAP informed of the Committee s activities.

It welcomes closer liaison and cooperation with ESCAP through RESAP II to help harmonise regional initiatives and to avoid unnecessary duplication in the development of the regional spatial data infrastructure.

### ***Regional spatial data infrastructure***

Through its active work programmes, PCGIAP has achieved significant progress towards the development of a regional infrastructure as follows:

#### ***APSDI***

Definition of the regional infrastructure (APSDI) — refer PCGIAP Publication No.1.

#### ***Geodetic framework***

The international terrestrial reference frame (ITRF) and GRS80 ellipsoid will be used as the regional horizontal datum. The values from the 1997 regional geodesy campaign are interim datum points for key permanent sites pending the development of site velocities in future campaigns. Transformation parameters will be developed to allow all GIS applications to be on an internationally compatible homogeneous positional framework.

#### ***Regional Fundamental data***

PCGIAP has been active in the development of draft policy for the sharing of fundamental data and guidelines on the custodianship of fundamental data.

There has been significant progress on the definition and development of regional fundamental datasets and the analysis of the establishment and operation of data nodes - the clearinghouse of the APSDI.

#### ***Development needs***

Data collection survey, workshops and other activities identifying and addressing member countries SDI needs through development projects and funding options.

#### ***Australian PCGIAP Contact Details***

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## **7. Regional Groups and Training**

Australian scientists in the field of space science and Earth observation are regular and enthusiastic participants in the regional meetings such as the Asian Conference on Remote Sensing (ACRS).

The WMO has 26 fully operational Training Institutes and runs courses both face-to-face and remotely. JMA and BoM cooperate in regional training in the Asia Pacific. In November 1996 the Australian Bureau of Meteorology hosted the WMO sponsored Asia Pacific Satellite Application Training Seminar (APSATS) attended by representatives from over 16 Asia Pacific nations and was well received. The Bureau plans to host the second APSATS in early 2001.

In October 1999 the Bureau hosted a one week meeting of the WMO Commission for Basic Systems Expert Team on Improving Satellite Systems Utilisation and Products which addressed a number of training and technical matters especially in the Asia-Pacific region dealing with satellite applications.

The WMO, with its established infrastructure for training that is operating effectively in the Asia-Pacific region, provides an important resource in any coordination and strengthening of regional activities in training and education in earth observation.

Australia is a participant in the APN climate change and the IGBP/APN START activity in the Asia Pacific region and has been responsible for the SEA START secretariat until the Oceania group was fully established.

APN also provides an existing and well established framework through which to develop and maintain regional cooperation in climate and climate change.

## **8. Other activities**

### **8.1. ACIAR and AusAID**

These agencies carry out projects in many countries of the region at the bilateral and regional levels. There is an increasing level of reliance on space applications in these projects. For example, an ACIAR project between Australia and China working on promotion sustainable agriculture practice through indicators and regional information has addressed sustainability through satellite derived Water Use Efficiency and other data.

### **8.2 Data Provision, Nodes & Archiving**

CSIRO is a regional node for the CEOS CILS and IDN in the region. These are CEOS demonstrations of data directories and locators. The CEOS WGISS is actively working on data issues and regional needs. In May, 2000 the CEOS WGISS meeting in Canberra will be addressing this and its interactions with the regional SDI. Australia is the regional node in the World Wide Fire Web initiative.

CSIRO and the Australian Bureau of Meteorology coordinate their provision of archived satellite data both nationally and internationally through utilisation of NASA's EOSDIS Information Management System and via contributions to the Global 1km AVHRR Land Data Set Project.

Like other regional countries, Australia has an established ground segment for space activities. Australia currently has two fully operational X-band ground station facilities in Hobart (SE coverage, owned by a consortium and operated by ACRES) at Alice Springs

(near the centre of the continent, owned and operated ACRES) and plans to build another station during 2000 located in Perth, on the western seaboard. Collectively these stations enable a capacity to acquire high resolution satellite data (typical satellites include ERS, SPOT, Landsat, EOS etc) over significant parts of the region which play a major role in sustainable resource utilisation and management. The operators of the network already work closely with other regional groups and look to increase this cooperation in the future.

### **8.3 Data Access**

The Australian Bureau of Meteorology has developed in partnership with industry, low cost meteorological satellite ground stations capable of receiving, processing and archiving data from GMS, MTSAT, SeaWiFS, NOAA and GOES, with FY-1c capability under development. These systems are used by the Bureau operationally around Australia and have also been exported and implemented in Asia-Pacific countries such as the Philippines, Fiji and Bangladesh with subsets of systems in a number of other countries.

Primarily through the Bureau of Meteorology, CSIRO and State Governments, Australia has been further developing systems for monitoring natural hazards and assisting in sustainable development activity via meteorological and related satellite data. These systems include fire and smoke monitoring over the Asia-Pacific region, tropical cyclone and severe storm monitoring, air pollution trajectory modelling, volcanic ash detection, vegetation and flood monitoring, solar radiation estimation.

### **9. The future**

Australian scientists and government agencies will continue to be active in regional Earth observation and space communications programs and other space application projects which aim to provide information of relevance and use to groups aiming to increase efficiency and sustainability of human actions. We look to RESAP-II to continue the excellent coordinating role it has played and provide a forum and mechanism to bring the many well established, but sometimes overlapping, programs together. The CRCSS has offered to host a meeting of the RESAP Working Group on Space Science and Technology Applications, and will continue to work in close association with the ESCAP Secretariat to assist in meeting the objectives of RESAP II.

In keeping with the view that sustainability only happens on the ground, future activities are encouraged to engage regional agencies directly involved in resource use and management and work to make them aware of the advantages of earth observation data in their task. This may require the operational agencies taking a bigger role for themselves in driving the agenda of activity, with RESAP, and even space agencies acting to coordinate and help in the success of the activities rather than carry out the activities.

The region is experiencing a rapid growth of space activity and has a growing sense of self-reliance. Australia looks to participate in this growth and promote the flow of benefits to the points of application. In this we also look to RESAP to take further steps along the path that started in Beijing of coordination and harmonisation of the many useful space activities, including the increasing industrial activity, to help accelerate even further the spread of practical benefits arising from space technology applications.