Committee on Earth Observation Satellites

CEOS NEWSLETTER

Summer, 1994

No. 3

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Report from CEOS Workshop on Developing Country Activities

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With the recommendation of the 7th Plenary Session, the Instituto Nacional de Pesquisas Espaciais (INPE) hosted a CEOS workshop from 16 to 18 May, 1994, at their headquarters in São José dos Campos, São Paulo-Brazil. It was attended by representatives from 11 CEOS members from all parts of the world, plus six observers and affiliates members. Many of the participants had first-hand experience of the use of satellite data in developing countries, and this no doubt accounted for the essentially practical approach which characterised the workshop.

The workshop was chaired by the hosts, Dr. M. N. Barbosa, Director of INPE and Dr. R. P. da Cunha, Coordinator of Institutional Relations of INPE. Representatives of the Space Agency Forum (SAF), the Comision Nacional de Actividades Espaciales (CONAE) of Argentina also attended the meeting. At the start of the meeting, participants had the opportunity to hear about the establishment of the new Brazilian Space Agency from its President, Dr. L. G. M. Filho. Dr. Filho stressed the particular personal interest in Earth Observation, and assured participants that his new agency would certainly continue to support the work of CEOS.

Mr. H. Seipel of DARA, on behalf of the CEOS Chairman, congratulated INPE for having taken the initiative to hold this very timely workshop, the results of which will provide a valuable input to the discussion on developing countries which will take place at the 8th CEOS Plenary Session in Berlin in September, 1994. The DARA Chairman intends to make this subject one of the major items for discussion during the 1994 Plenary.

The first part of the workshop was devoted to a series of presentations from participants, describing their current and planned Earth Observation programmes of relevance to developing countries. A number of other CEOS members, unable to attend the meeting, had provided explanatory material which was also tabled.

Dr. B. Bizzarri the representative of the Italian Space Agency was present and, as Chairman of the SAF Focus Group on the Spread of Benefit of the Mission to Planet Earth towards Developing Countries, he was able to present an advanced draft of his group's report which is to be given to the next SAF Plenary Session in Buenos Aires on 14-15 November, 1994. This coordination enabled the workshop to ensure the maximum compatibility between the recommendations being made to the SAF Plenary and those to be presented from INPE Workshop to the CEOS Plenary.

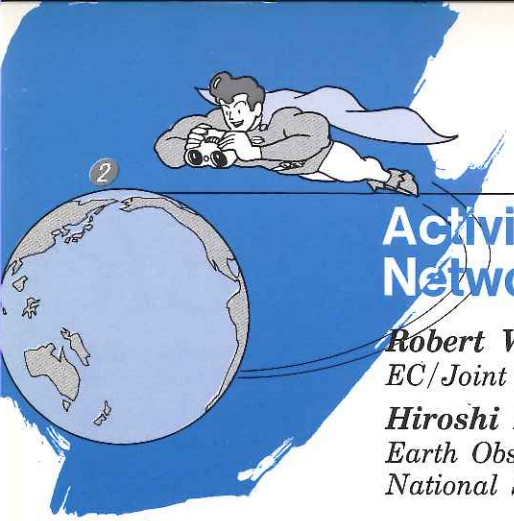
The material provided during this first part, and the ensuing discussion, made an interesting and appropriate background against which the workshop could address its main objective: **to identify suitable CEOS actions in support of developing countries.**

Introducing this second part, Dr. da Cunha tabled a helpful background paper and the first draft of a plan of action to be recommended to the CEOS Plenary. Participants were unanimous in supporting the Chairman's aim to produce a set of concrete recommendations.

The discussions centered on two areas:

- actions which CEOS could and should undertake (subject to Plenary approval), either through the Secretariat, through individual initiatives on behalf of CEOS, or via our respective agency programmes; and
- general principles for successful work with developing countries, based on the experience of the workshop participants.

(to be continued on page 7)



Activities of CEOS Ad Hoc Working Group on Networks

Robert Witty
EC/Joint Research Center, Italy
Hiroshi Kikuchi
Earth Observation Planning Dept,
National Space Development Agency of Japan

It is remarkable to see the recent developments in information technology. The computer and communications are changing our world very rapidly. Earth Observation is no exception. The network will bring about a new, revolutionary interaction of users with Earth observation data.

The user will be able to directly access data from anywhere and at any time. In the light of the network importance, the Science and Technology Agency (STA)/National Space Development Agency of Japan (NASDA) proposed a global network and establishment of a Working Group on Networks at the CEOS 1993 Plenary. The CEOS Plenary acknowledged the utmost importance of networks and established the Ad Hoc Working Group on Networks (AHWGN). AHWGN represents the Preparatory/Definition Phase, and may lead to establishment of a full CEOS working group. AHWGN is co-chaired by Dr. R. Witty (EC) and Mr. H. Kikuchi (NASDA) and consists of a reduced tri-partite core of Europe (ESA/EC), Japan (STA/NASDA) and US (NASA/NOAA). AHWGN has been mandated with the following tasks.

a) Review the high level requirements for network connectivity and interoperability,
b) Examine existing and emerging network capabilities,
c) Prepare guidelines for the future development of members' network services, and
d) Develop an implementation plan and coordinate the CEOS approach to a global network system.

AHWGN will prepare a final report on its initial work program for the 1994 CEOS Plenary. This article describes the activities of AHWGN and summarizes the progress to date.

Requirements for global networks

AHWGN has been trying to develop a clear understanding of the need for international networks related to Earth observation activities - both internal networks (utilized by space agencies for data management and transfer) and external networks (for user access and support). Efforts were made to estimate the scale of the international data transfer requirements associated with future (1998) missions of the AHWGN member agencies - to enable comparison with the projected network capacity and connectivity. Initial results indicate significant requirements from the users in Europe, Japan, and USA to share and exchange the data products and information services from each other's future missions.

AHWGN also studied the requirements for network services which will be made available through either internal or external networks. These network services include.

a) Receive and transfer data to support production of global datasets,
b) Exchange mission information (e.g., planned scheduling),
c) Provide command and control support for cooperative international missions,
d) Provide user access to international datasets, and
e) Support collaboration services among users.

Existing and emerging network capabilities

AHWGN has been attempting to define an overview of current and future network capabilities, based upon capability information supplied by individual countries and agencies with assistance of the Network Subgroup of the Working Group on Data (WGD). It revealed that numerous activities are being undertaken to develop network capabilities on national, regional and global scales.

AHWGN also studied network services planned in support of future missions. It is apparent that data networks are already an integral part of the data management and supply activities of the agencies. Networks will play a central role in managing and distributing the datasets from future Earth observation missions, particularly in satisfying the increasing demand for near-real time data transfer and on-line information service for users.

Concept for global network services

AHWGN has been developing a description of its concept for global network systems and services with assistance of the Network Subgroup of WGD. AHWGN has discussed a vision for the future in which the application of network technology makes possible new levels of cooperation between international partners in managing data from Earth observation satellites. It also introduced new concept for interfacing with users worldwide. This vision revolutionizes the way in which Earth science data is accessed and utilized.

The AHWGN members have agreed that the best way to develop a global network concept is in terms of future international network services, based on the data and information system of the individual international partners and made interoperable through the adoption of standards, common technology and coordination in development. This concept is based upon the principle of maximizing existing resources of individual members through coordination of network connectivity and service interoperability.

Future works

AHWGN considers that the immediate approach for CEOS to develop global network systems and services is to undertake a program of pilot projects and prototyping to

- Demonstrate connectivity and interoperability between the services of international partners and
- Help to evolve user requirements

AHWGN is preparing a proposal for CEOS to address global networks and network services.

Second CEOS User Requirements Workshop

Volker Liebig
Head of Division, Earth Observation Utilization
German Space Agency (DARA)

Gunter Schreier
Rapporteur CEOS User Workshop
German Aerospace Research Establishment (DLR)

The key objective of CEOS is to coordinate space based Earth observation activities, including global change. The domains of coordination start from the space segment - the satellites and sensors itself - affect further the ground segment - how data is acquired, processed, archived, formatted and distributed and go further to the validation and calibration of the data - making data content comparable and reliable.

Another focus of CEOS is to increase the awareness, that the activities of the CEOS members shall be driven by user requirements and data needs. Therefore, CEOS is working on the assessment, how well space programmes will meet user requirements. The CEOS affiliates and observers play an important role in this analysis.

To perform the analysis, CEOS has initiated User Workshops, a forum, where users - represented primarily by the global environmental research and operational monitoring organizations, affiliated to CEOS and CEOS members and observers, meet to discuss whether data needs and data availability can be matched. CEOS so far has organized two User Workshops. After an initial affiliates meeting in Geneva (March 22-23, 1993), the first User Workshop was conducted by STA/NASDA on May 27th, 1993 in Tokyo, Japan. Endorsed by the CEOS Plenary, the attendees concentrated to support the compliation of a CEOS Dossier (Volume C), named "The Relevance of Satellite Missions to Global Environmental Programmes". The first version of this dossier is available.

The Second User Requirements Workshop was hosted by the German Space Agency (DARA) from May 30-31, 1994 in Bonn, Germany.

More than 30 participants from the CEOS affiliates, observers and members attended the Workshop. The presentations and discussions were initially focussed on the review of user needs by major global environmental programmes such as International Geosphere-Biosphere Programme (IGBP) or World Climate Research Programme (WCRP) as well as the World Meteorological Organisation (WMO). It was observed, that the specific requirements of the global atmospheric and meteorological observation and research programmes are well represented in CEOS. Their requirements will be forwarded for compilation into the next version of CEOS Dossier C.

It was noted, that the current dossier needs constant updates and improvement in details as priorities of measureables or a statement of minimum measurement accuracy.

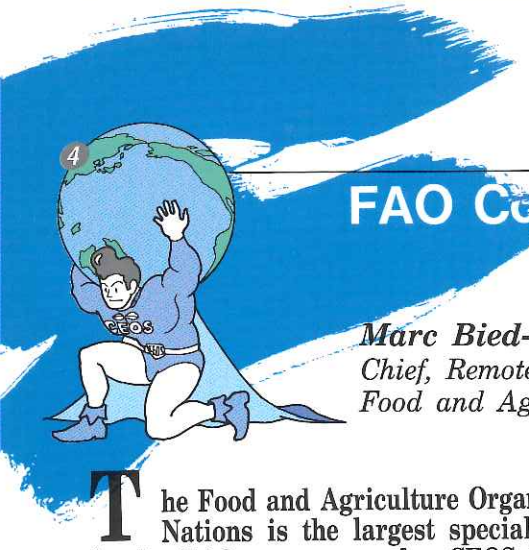
The second theme of the User Requirements Workshop was the consideration of regional requirements. This topic was introduced by presentations of CEOS members on the status of programmes and user requirements for their particular high resolution sensors and by examples of regional user assessment studies (e.g. Canadian resource management study, European requirements for environmental purposes).

The discussion on regional requirements brought everyone to the attention, that a clear definition of the term "regional" is missing. For example, high resolution observation of the tropical forest could well be a sample for a global observation of the ecosystem, whereas typical environmental sensors such as AVHRR could also serve regional needs. However, it was recognized that the current global environmental user requirements compilation does not reflect the entire user community and CEOS should decide how much it should be concerned with regional applications. A corresponding recommendation will be forwarded to the Plenary. The mechanism, how to access regional user requirements need to be established and will be subject of a following User Workshop, if approved by the Plenary.

The third topic of the User Requirements Workshop was the distribution and availability of the CEOS Dossier. Based on the recommendation from the Plenary, two options - besides standard paper print versions - were presented. Already in operation is the CEOS InfoSys, an online information system established by ESA-ESRIN in Frascati, Italy. InfoSys can be accessed via World Wide Web, Gopher, Hyper-G, Telnet, rlogin and DECNET/SPAN.

The other electronic version of the CEOS Dossier Vol. C will be published on PC diskette, supported by a simple programme, which allows easy navigation and information retrieval within the document.

The second CEOS User Requirements Workshop concluded with the common understanding of all participants, that the CEOS' affiliates requirements on remote sensing information are a substantial input for the exploitation of on-going and the definition of future remote sensing systems. Therefore, the active dialogue between the space agencies and the international user groups forms an important part on the CEOS agenda and the future activities of CEOS.



FAO Contribution to Developing Countries

Marc Bied-Charreton
Chief, Remote Sensing Centre, AGRT
Food and Agriculture Organization of the United Nations

The Food and Agriculture Organization (FAO) of the United Nations is the largest specialized agency within the UN family. FAO was approved as CEOS Affiliate at 1993 Plenary. The mandate of the FAO lies in the fields of nutrition, food and agriculture, including fisheries and forestry, and the functions include the collection, analysis and dissemination of information; the promotion of research and education, the management of natural resources, on a sustainable basis and provision of technical assistance.

In order to stimulate and guide the use of remotely sensed information in the various activities of FAO, a Remote Sensing Centre was established in 1980. The activities of the Centre, excluding those related to agrometeorology, comprise broadly the following:

- Advisory services on space applications and pilot action studies;
- Remote sensing education and training;
- Technical support to field projects;
- Satellite monitoring of environmental conditions and food security.

While all services provided by the Centre are basically available to all member countries of FAO, the focus of fulfilling its mandate is clearly on developing countries.

Current Activities A large number of field projects are currently being executed with assistance from the Centre. These projects are to a large degree related to land use and land cover, but can also include rainfall estimation, soil survey, agricultural statistics, vector borne diseases, cadaster applications, etc. The following may serve as examples.

- In Egypt the USAID funded project on "Monitoring, forecasting and simulation of the Nile Basin" is executed, in which Meteosat data play an important role in the modelling of rainfall over the catchment of the Nile River, in order to forecast the inflow into Lake Aswan. Also in Egypt, a project has been executed to upgrade the facilities of the Desert Research Centre for the monitoring of rangelands using NOAA HRPT data. The HRPT facility has now been integrated into the ESA Earthnet network.
- For Afghanistan a project is executed at FAO Headquarters for the inventory of land cover at 1: 100,000 and 1:250,000, based on high resolution satellite data and include the digitization of interpretation results and topographic data.
- As part of the FAO Forest Resources Assessment 1990 Project, the first global (tropical) forest resources inventory since 1980, a large number of Landsat scenes have been used in a multitemporal analysis, using a statistical analysis procedure for decision makers.

In the field of education and training, 9 training courses or workshops were organized or are planned for the 1993/94 period. The courses are being held both in developed and in developing countries and cover a wide range of applications.

In the field of monitoring of environmental conditions, the Centre has since 1988 been operating the Africa Real Time Environmental Monitoring Information System (ARTEMIS). This system acquires and processes routinely and in real-time hourly Meteosat thermal infra-red data into estimates of rainfall and "cold cloud duration" and in near-real-time daily NOAA AVHRR GAC data into Normalized Difference Vegetation Index (NDVI) images. (see next page) The system covers the whole of Africa and the products are produced on a 10-daily and monthly basis for use in the field of "early warning for food security" and "desert locust control". These activities, which take place in FAO Headquarters, for the global assessments, as well as at the national and regional levels, have a defined need for up-to-date and objective information on the status of the growing season, which can not be fully obtained by classical, ground based observation techniques. As part of the ARTEMIS programme, also support is given for the establishment of local reception and processing capabilities and the technical support to a large number of FAO executed projects to strengthen national and regional early warning systems in Africa.

Future Activities It is expected that the current thrust of the Remote Sensing Centre' activities will increase in the future. In addition, three potential new activities can be mentioned here.

First of all, the Land Cover Map of Africa. There is an urgent need for an up-to-data inventory and mapping of actual land cover of Africa at 1:250,000 and 1:1,000,000 scales. Currently, no such map exists, unless compiled from a wide variety of sources and variable scales, legends and accuracies. However, for the proper monitoring of land cover changes and the modelling of the effects of climate change, such baseline information is a necessity. It is hoped that during 1994 sufficient donor support is found to start with the East Africa part of this substantial exercise.

Secondly, the "Remote Sensing Processing and Archiving System" (RESPAS) proposal. The framework of RESPAS arose out of the need for an operational monitoring tool as part of the Tropical Forest Action Programme (TFAP), of which FAO holds the secretariat. It is expected that through appropriate remote sensing tools RESPAS will in the future be able to assist member countries in the assessment, monitoring and management of their forest resources.

For the Asia and Pacific region, FAO, in close cooperation with ESCAP and UNEP, is presently formulating the OLIVIA programme for the development and implementation of a series of coordinated projects aiming at improving the access to and operational use of satellite data for sustainable development and monitoring of natural resources.

Fourth CEOS Ad Hoc Data Policy Meeting

Linda Moodie
Senior International Relations Specialist,
NOAA/NESDIS, USA

On April 18-19,1994, CEOS members met in Washington, D.C. for a fourth CEOS Ad Hoc Data Policy Meeting -- this meeting designed to discuss satellite data provision principles in support of operational environmental use for the public benfit.

Previous data policy meetings had discussed satellite data exchange principles in support of global change research, a mechanism to make commercial satellite data available at reduced costs for global change research purposes, and the initiation of a pilot project with the International Geosphere-Biosphere Program.

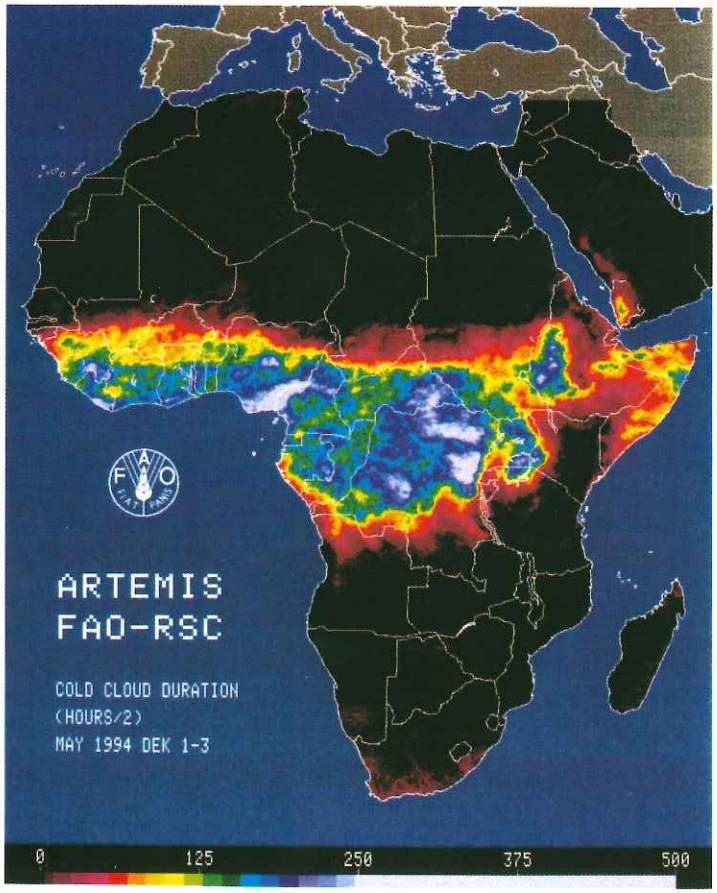
The objectives of the April meeting were to:

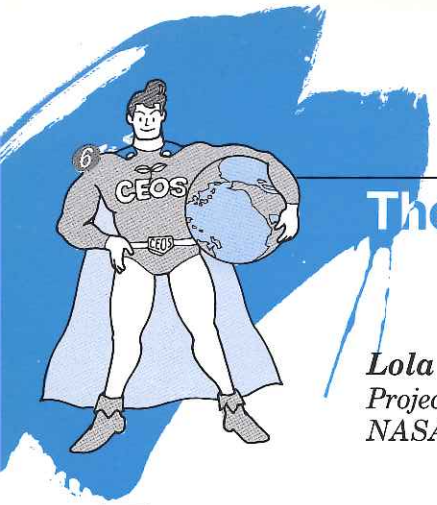
- identify the extent to which there is a common view on data provision in support of operational environmental use for the public benefit;
- discuss and develop for CEOS Plenary consideration a set of Data Principles in Support of Operational Environmental Use for the Public Benefit; and
- prepare a report to the 1994 CEOS Plenary on the outcome of the meeting.

In keeping with the views of the 1993 CEOS Plenary when it endorsed NOAA's and NASA's offer to hold the ad hoc meeting, the meeting participants focused on areas of common understanding and those that promote increased access to and availability of satellite data. Members recognized the need for enough flexibility to accommodate the differing objectives, policies, and laws affecting CEOS agencies. A set of principles would need to be in harmony with the context in which CEOS agencies operate and yet still strive to promote the growth and potential benefits of space-based Earth observations -- one of the common goals which bring CEOS agencies together.

The meeting succeeded in producing a draft "Preliminary Resolution on Principles of Satellite Data Provision in Support of Operational Environmental Use for the Public Benefit." This draft resolution will be discussed and considered for adoption by CEOS members at the CEOS Plenary meeting in September 1994.

The image of the Africa Real Time Environmental Monitoring Information System (ARTEMIS) by FAO





The International Directory Network (IDN)

Lola M. Olsen
Project Manager, Global Change Master Directory
NASA/Goddard Space Flight Center, USA

Through the CEOS Working Group on Data, representatives from the American, Asian, and European continents have collaborated to provide information about their countries' scientific data sets. This working group represents many agencies, universities, and other organizations within each country.

The system of networked connections among the countries that offer and exchange data set information is called the CEOS International Directory Network (IDN). Earth science data set references presently dominate the directory. A recent brochure displays access, assistance, and other services available within each country's domain. The brochures are available through the Global Change Master Directory's (GCMD) User Support Office - Code 902, NASA/Goddard Space Flight Center, Greenbelt, MD 20771. One can also reach the user support office by phone: +1(301)441-4202 or by FAX: +1(301)441-9486, or through the Internet: mduso@gcmd.gsfc.nasa.gov. To access the American node of the IDN through the Internet: telnet gcmd.gsfc.nasa.gov (192.107.190.77) and login as "gcdir"; or use the Uniform Resource Locator (URL), http://gcmd.gsfc.nasa.gov/ through World Wide Web. No password is required. Both X-Windows and ASCII interfaces are supported.

Argentina Joins CEOS IDN As Cooperating Node

The CEOS IDN is an operational system with three coordinating nodes representing the international science community: (1) American - at NASA/Goddard Space Flight Center, Greenbelt, MD, USA; (2) Asian - at National Space Development Agency of Japan (NASDA/EOC) in Saitama, Japan; (3) European - at the European Space Agency/European Space Research Institute (ESA/ESRIN) in Frascati, Italy. These coordinating nodes maintain duplicate

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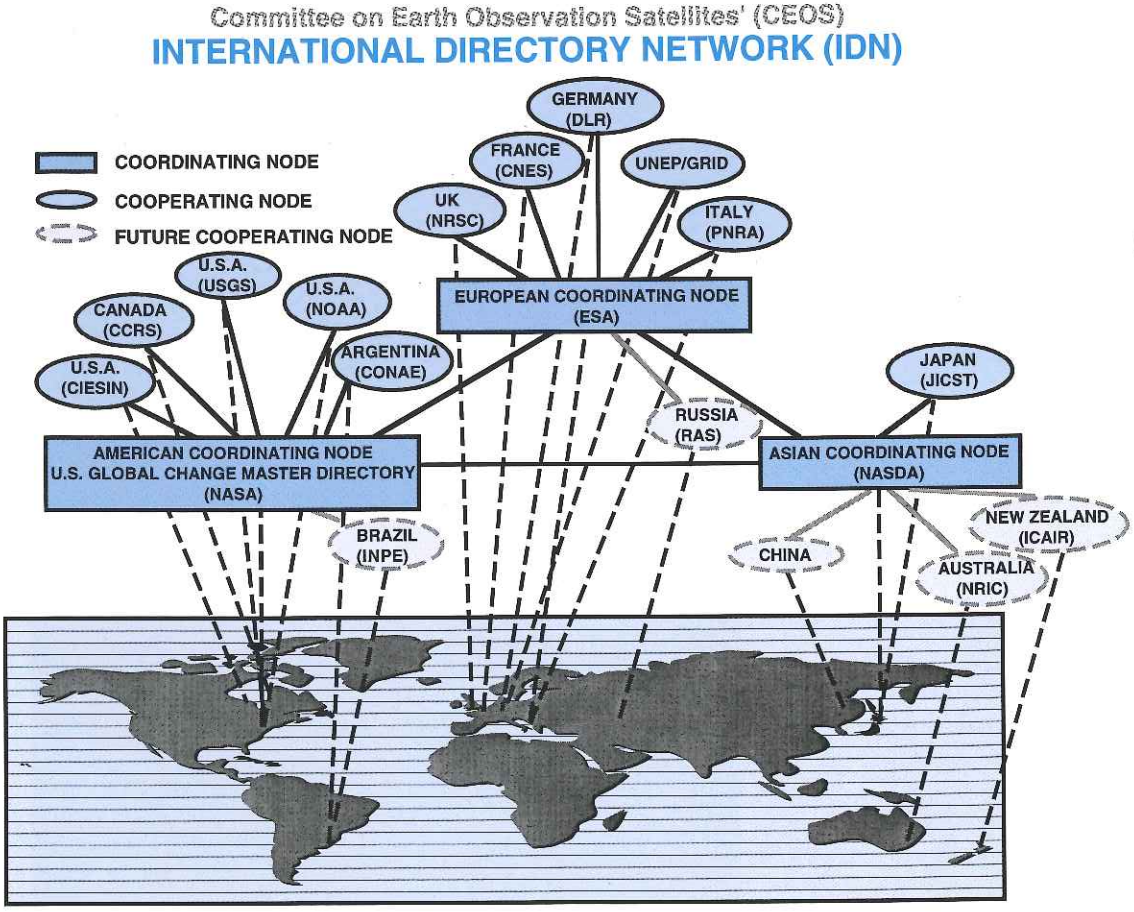

copies of the database and the operational software. Japan (JICST), Canada (CCRS), France (CNES), Germany (DLR), the UK (NRSC), Italy (PNRA), countries represented by UNEP/GRID, and several agency nodes in the USA represented by NOAA, USGS, and CIESIN have each been considered "cooperating" nodes. These nodes provide a path for researchers within these countries to exchange information with the CEOS IDN. In March, 1994, a new cooperating node was installed in Argentina (CONAE). Russia, Australia, Brazil, New Zealand, and possibly China will join the network in the coming years. Several data set entries have already been received from these countries.

Commitment to Population of the Directory

Entries for the directory are submitted in a standard format, the Directory Interchange Format (DIF), providing standardized information on parameters, geographic and temporal coverage, data set location, and other summary information that can be automatically loaded into the database. DIFs are submitted to the GCMD's discipline "coordinators", who quality-control submitted DIFs, as well as write DIFs for important data sets they identify. The value of the directory depends on current data set information, and the effort is committed to referencing data sets from as many available sources as possible. In addition, software to assist in formatting data set entries will be made available in the coming year.

New Version of Software Released

Usage statistic emphasize the increasing popularity of the directory, with more than 5,000 sessions logged between January and June, 1994. Directory users are offered several options for their interface to the client-server system, based on their terminal capabilities. A software update (CEOS IDN Installation Package, Version 2) was released on June 15th, 1994, which incorporates upgraded loader software and an X-Window client. Two additional releases are planned within the next year, which will include improved geographic search capability and an enhanced X-Window client.

The Future

Future plans include maintaining CEOS IDN node compatibility and integrity, increasing data set population, successfully integrating technological innovations, improving the geographical search, enhancing the X-Window client, incorporating the content standard for digital geospatial metadata with the DIF, and migrating the system to a "distributed" architecture. WAIS-based full text searching on the contents of the directory is planned, in addition to improved keyword searches.

Report from CEOS Workshop on Developing Country Activities

(continued from page 1)

- those which the CEOS Secretariat could take. The distributed secretariat has already shown that it is very effective in such actions, but care must, of course, be taken not to overload it.
- those to which all members of CEOS could contribute;
- those for consideration by individual members, observers and affiliates.

In this respect a number of provisional commitments were made by participants during the workshop.

The general principles for successful work with developing countries were not intended to replace the many valuable lessons and principles that have previously been enunciated by several organizations with experience in this field. It is felt, however, that there was sufficient experience represented at the workshop to warrant an attempt to produce a short list of purely practical points which are worth bearing in mind. It is hoped that these "principles" will be of use to all CEOS members, and perhaps to others also.

The report which will be made to the 8th CEOS Plenary Session will describe in some detail the various recommendations, and the CEOS Chairman has already signalled his intention to incorporate the output from the Workshop in a report to Plenary setting support to developing countries in a wider contest, taking into account the on-going discussions on the further evolution of CEOS strategy.

The final seal of success for this Workshop can only be given after the Plenary Session this coming September, but participants were agreed that it was a remarkably workmanlike event, and that INPE had done an excellent job in managing the meeting. It is to be hoped that developing countries will also find the outcome helpful, for that was the object of the exercise.

CEOS Activities in 1994

After the last Plenary meeting in Tsukuba the German Space Agency (DARA) has taken over the chairmanship of CEOS. 1994 is the tenth year since CEOS was founded after a G-7 initiative. During the last Plenary meeting CEOS members decided in a strategy debate to focus CEOS to uniquely suited activities which are not possible outside the CEOS framework. Nevertheless many ongoing and selected new activities are on the plan for 1994.

CEOS will continue to perform valuable standardization and definition work in its Data and Cal/Val working groups and corresponding subgroups. In addition an Ad Hoc Working Group of Networks is preparing a proposal and a workplan for the future CEOS way in the area of international data networks.

Based on initiatives of the member, affiliate and observer organizations

a) NASA/NOAA invited for an Ad Hoc Data Policy Meeting to Washington, which discussed "Principles of Satellite Data Provision in Support of Operational Environment Use for the Public Benefit".

b) INPE invited to a developing countries workshop to São José dos Campos, Brazil and DARA as the 1994 CEOS host will work on an overall strategy of CEOS toward developing countries including the results of this meeting.

c) DARA organized an User Requirements Workshop in Bonn to continue the dialogue between data providing agencies and users of the systems

The reader will find more detailed reports about all meetings in this newsletter.

The Dossiers will soon be available on electronic media and via internet (see User Requirements Workshop report on page 3). This ongoing work is performed under ESA's responsibility and funding.

DARA will present a strategy paper to the Plenary to continue the discussion of 1993 and NASDA is working on a Satellite Data Application Report.

The CEOS/IGBP-DIS Pilot Project on Data Exchange is well on its way and the reader found a summary in the last CEOS newsletter.

CEOS Plenary 1994 and 10-Years Anniversary

The next Plenary Meeting will take place in Berlin, Germany, September 26 to 28. The Plenary will be followed by a 10-Years Anniversary celebration in the Kronprinzenpalais at the afternoon and evening of September 28.

News Highlights

- Mr. Shushi UETA was designated as Director of International Space-Affairs Division, Research and Development Bureau, STA, Japan, on May 20, 1994, succeeding Mr. A. Fujita.
- The office of Earth Observation Systems, NASDA, Japan has moved since June 20, 1994.

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CEOS Meeting Calendar

Activities	1994				1995		
	September	October	November	December	Jan. -----	May -----	Sept.
Plenary level	▲ **8th Plenary & 10th Anniversary** (9/26-28, DARA/Berlin, Germany)						△ **9th Plenary** (Nov., CSA/Canada)
WGD (Working Group on Data)	▲ **CS-13** (9/19-21)/ **NS-7** (9/21-23, DLR/ Oberpfaffenhofen, Germany)	▲ **ADS-8** (10/17-19)/ **FS-9** (10/19-21, BNSC/ Farnborough, UK)	▲ **WGD-17** (11/1-4, NRSCC/CMA/ Beijing, China			△ **WGD-18** (early 1995, Roskomgidromet/ Russia) △ **CS-14/NS-8** (April, ESA/ Frascati, Italy)	△ **WGD-19** (late 1995, CCRS/Canada) △ **CS-15/NS-9** (Sept., NASA/ Ames, USA)
WGCV (Working Group on Calibration and Validation)	▲ **SAR** (9/28-30, Univ. of Michigan/ USA)			▲ **WGCV9** (12/6-9, CSIRO/ Australia) ▲ **IVOS/TM** (12/5-6,CSIRO/ Australia)		△ **WGCV 10** (June, Russia)	
WG INS (Interim WG on International Network Services)				△ **WGINS-1** (Nov./ Dec., STA/Japan)			

▲: determined △: to be determined
(Date, Host organization/ Location)

Meetings are open only to CEOS designated participants.

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