



# NEWSLETTER

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## No. 1

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## Commentary

# Earth Observation Satellites to Help Resolving Global Environmental Issues

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Global environment issues such as the global warming, depletion of the ozone layer, and deforestation have received much attention lately. Increasingly, mankind is turning to science for the resolution of these issues as well as global climate change phenomena such as el Niño.

As pointed out in "Agenda 21," an action plan developed at the United Nations Conference on Environment and Development (UNCED) held in Brazil, June, 1992 and in the communique issued by the Munich Summit in July, 1992, global satellite observation and monitoring systems are among the most effective means for understanding and resolving these issues. There is thus already a world consensus regarding the important of using Earth observation satellites to help resolve global environmental issues.

To support these monitoring and observation efforts, Japan is currently operating Marine Observation Satellite (MOS)-1/1b and Japanese Earth Resources Satellites (JERS)-1. Japan has also developed the Advanced Earth Observing Satellite (ADEOS) for a 1996 launch. In addition, Japan has been cooperating in a joint program with the United States to develop the Tropical Rainfall Measuring Mission (TRMM) for launch in 1997. In the area of policy, STA made the "Long-Term Scenario for developing future Earth observation satellites by 2010" and the "Ground System Concept" as national strategies in May 1993 to satisfy needs in various fields such as disaster monitoring.

The Committee on Earth Observation Satellites

(CEOS) was created in 1984 as an outgrowth of the the G-7 Versailles Summit in 1982. Since then, CEOS has contributed to the activities of space agencies worldwide by reviewing each Earth observation satellite program, establishing satellite information networks, and utilize space-derived data effectively. We are confident that CEOS activities will become more and more important and that expectations for CEOS will continue to grow.

In the future, it will be necessary for nations worldwide to cooperate in and share the benefits of Earth observation satellite programs. Specific areas of cooperation include establishing ground systems including a global information network and facilitating data utilization by developing standards and requirements. In this regard, Japan presented its concept of a "Global Satellite Observation and Information Network" and proposed a feasibility study for the establishing the concept at the CEOS Data Policy Meeting held in Tokyo in May 1993.

The publication of the CEOS Newsletter is both timely and welcome—timely in that it addressed global issues of current interest and welcome in that it will publicize the concept and aspirations of the CEOS. It is therefore a distinct pleasure and honor for me to have had the opportunity to present my comments in this inaugural issue.



## Committee on Earth Observation Satellites (CEOS)

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**C**EOS was created in 1984 as a result of the international Economic Summit of Industrialized Nations and serves as the focal point for international coordination of space-related, Earth observation activities.

Policy and technical issues of common interest related to the whole spectrum of Earth observation satellite missions and data received from such are addressed. CEOS encourages complementarity and compatibility among space-borne Earth observing systems through coordination in mission planning, promotion of full and non-discriminatory data access, setting of data product standards, and development of compatible data products, services, and applications. The user community benefits directly from this international coordination.

Members are those national and international government agencies with funding and program responsibilities for a satellite Earth observation program currently operating or in the later stages of system development. CEOS members include CSIRO (Australia), INPE (Brazil), CSA (Canada), CAST (China), ESA and EUMETSAT (Europe), CNES (France), DARA (Germany), ISRO (India), ASI (Italy), STA (Japan), ROSKOMGIDROMET and RSA (Russia), SNSB (Sweden), BNSC (United Kingdom), NASA and NOAA (United States). Governmental entities with a space-based Earth observation program in the early stages of development or with a significant ground segment activity that supports CEOS member agency programs may be invited to participate as an observer. Current observers are BOST (Belgium), CCRS (Canada), NRSC (China), CEC (Commission of the European Communities), CRI (New Zealand), and NSC (Norway).

Affiliate status for other international satellite coordination groups and for international scientific and intergovernmental bodies was approved by CEOS members in November 1990. The intention was to strengthen interaction with these organizations and to foster the presentation of scientific and other user requirements to satellite and instrument providers. To date, the Global Climate Observing System, Global Ocean Observing System, International Council of Scientific Unions and its International Geosphere-Biosphere Program (IGBP), Intergovernmental Oceanographic Commission, U.N. Environment Programme, World Climate Research Program, and World Meteorological Organization have affiliated with CEOS and have begun to participate in CEOS plenary and working group meetings.

CEOS Plenary meets at least once a year to pursue coordination, make consensus decisions on matters that can be carried out across agency programs, and provide direction to its technical working groups, which each meet up to three times a year. There are currently two work-

ing groups, each with four active subgroups.

The Working Group on Calibration and Validation (Cal/Val) was reorganized in 1991 under Canadian chairmanship. Work includes coordination of calibration/validation campaigns, exchange of technical information, and optimizing and sharing of available facilities, expertise and resources, as appropriate. The working group has a long-standing Synthetic Aperture Radar Calibration Subgroup, which continues to hold annual workshops—next one scheduled for September 20-24, 1993 at Noordwijk, The Netherlands. In 1992 three new subgroups were created: Infrared and Visible Optical Sensors, Passive Microwave Calibration, and Terrain Mapping. Also in 1992, the working group established a newsletter, an electronic bulletin board (CEOS.WGCV.NEWS/OMNET), and a library. The first issue of the Cal/Val newsletter, which will be published twice a year, was distributed in December 1992. A calibration/validation section of the CEOS Ground Segment Dossier is underway.

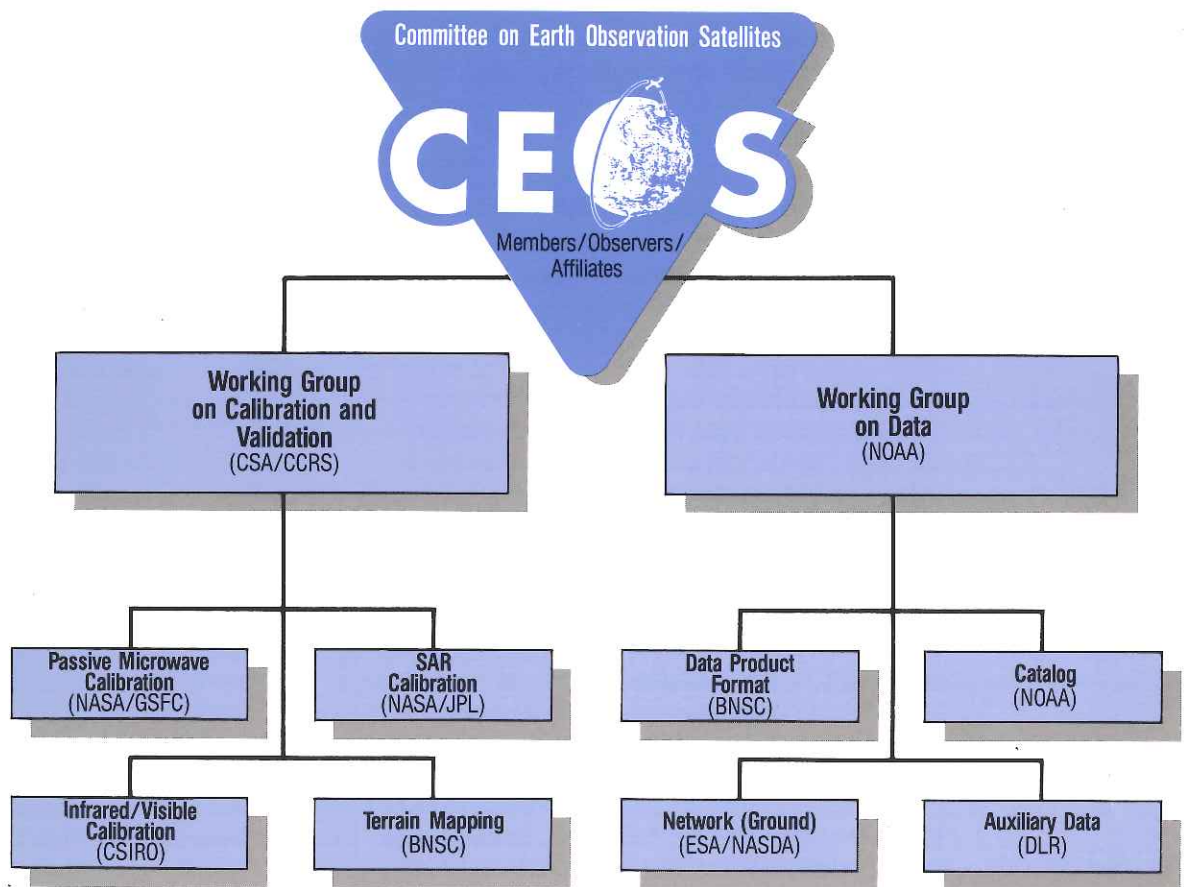
The CEOS Working Group on Data (WGD) was established at the initial meeting of CEOS in 1984 to facilitate the use of data from Earth observations missions by coordinating and standardizing aspects of data management where possible. WGD now has four technical subgroups to address specific issues in detail: Data Product Format; Catalog; Network; and Auxiliary Data. In addition, WGD has established a mechanism for sharing information among its members on ground system technology.

The primary goal of the WGD Data Product Format Subgroup is to develop and support standard data formats for digital user products from all Earth observations sensors. CEOS-compliant formats have been developed and accepted by CEOS WGD, and member agencies have agreed to incorporate them into ongoing data management planning. To further such coordination, a library of accepted formats is maintained.

The goal of the Catalog Subgroup (CS) is to promote international catalog system interoperability. Such a system allows users to determine what data of interest exist, how they can be obtained, and how other information supporting the utilization of the data can be acquired. CS coordinated the development of the CEOS International Directory Network with Coordinating Nodes in the Western Hemisphere, Asia, and Europe and drafted a document that presents guidelines and recommendations for developing internationally interoperable catalog systems.

The Network Subgroup is addressing issues of user-to-user communication using ground-based networking to deliver a variety of data, including catalog (Directory, Guide, and Inventory) information, browse, and quick-

## CEOS Working Group Structure



look imagery, as well as raw data sets or derived data sets.

The Auxiliary Data Subgroup, formed in October 1992, is focusing on auxiliary (i.e., non-satellite) data sets, stressing interaction with CEOS affiliates in special fields of global change research.

Another important activity of the Working Group on Data is coordination with the International Geosphere-Biosphere Program on the Global Land 1-KM AVHRR Data Set Project, being conducted by the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, the U.S. Geological Survey, and the European Space Agency, with participation by the Commonwealth Scientific and Industrial Research Organization of Australia.

The international cooperation and coordination that has taken place at and through CEOS has been of benefit not only to those space Earth observation agencies that comprise CEOS, but also to the global community that uses satellite data. One item that has been well received is the CEOS dossier of all CEOS agency space and ground-segment assets, with cross-references to global change research requirements for respective satellite Earth observations. One affiliate member described the volume as the single most valuable document he has ever had for

satellite data. CEOS members have agreed to issue an annual yearbook, i.e., an updated Executive Summary, of the space-segment and ground-segment dossier. The first of these yearbooks was issued and distributed to delegations at the U.N. Conference on Environment and Development in June 1992.

In summary, CEOS is a consultative organization—striving for information exchange, coordination, and consensus on policy issues. Findings and recommendations of CEOS are acted upon at the discretion of each member. CEOS deliberations and recommendations help members to come to agreement on issues and to ensure appropriate coordination among national programs and across the spectrum of space-based Earth observation missions and data management activities.



## Review of Past Activities: The CEOS Dossier

**Huw Hopkins**  
*Manager of Earth Observation Data Policy, ESA*

**I**t is generally recognised that there is a need for the international space agencies to provide complementary measurements on different Earth observation missions so that, within financial constraints, the maximum range of measurements can be made in support of environmental and other programmes.

This requires collaboration between agencies to avoid omissions and unnecessary duplication of measurements; and interaction with the user programmes to ensure the correct measurements are made. CEOS provides the forum for space agencies to interact and coordinate their programmes and to enter into a dialogue with users.

As part of the ongoing effort to strengthen dialogue between the satellite data providers and the data users, the fifth CEOS plenary meeting in December 1991 resolved to compile a dossier of satellite missions, instrumentation and ground segments and to collate information on international environmental programmes—particularly in relation to their satellite data requirements.

Subsequently, the British National Space Centre (BNSC), in its role as the 1992 CEOS Secretariat, commissioned the production of a series of documents to set out the current and future plans of CEOS members, and their relation to the needs of the observers and affiliates. After a series of revisions, the final set of draft documents produced during 1992 comprised three volumes—as shown below. In addition, an edited version of Volumes I & II was issued in support of the June 1992 UNCED conference in Rio, presenting the contribution of EO missions towards addressing global environmental problems.

The draft dossiers were all well received at the 1992 CEOS Plenary meeting in London and the concept of 'the CEOS Dossier' was accepted as a success—due mainly to the enthusiastic co-operation of all contributing members and affiliates. It was agreed at the meeting that the true value of the dossier would be as a 'living' document—updated annually to take account of the evolving nature of both the plans of the space agencies and the requirements of the affiliate users.

At the 1992 Plenary it was decided to establish a multi-party distributed secretariat to share the administrative functions of CEOS. Under this arrangement the European Space Agency (ESA) accepted responsibility for updates to the 3 volumes of the CEOS Dossier, and to consider the requirement for future versions of the UNCED 'yearbook'. ESA has since commissioned the production of the 1993 version of the CEOS Dossier and progress is well underway in collating the updated plans from both members and affiliates. The 3 volumes will be re-issued in good time for the Tokyo plenary in November.

Volume II of the CEOS Dossier was entitled "The

Relevance of Satellite Missions to Global Environmental Programmes" and might be regarded as the 'applications' volume of the current dossier. As key users of satellite data, global environmental programmes were the focus for the first CEOS applications volume. Future volumes of the dossier could feature applications of concern to other key users groups. Such a suggestion has already been made to CEOS by the Canadian Space Agency (CSA) which has proposed that the plenary investigate the production of a 'CEOS Dossier on Resource Management'. The CSA plans to submit a detailed proposal for the dossier at the seventh CEOS Plenary in November. The CEOS Working Group on Calibration and Validation has also proposed a 'Cal-Val Dossier' detailing the capabilities of member agencies and the procedures involved for different types of instrument.

Further work leading from the CEOS Dossier is being undertaken by the CEC, which is producing a document comparing the availability of data from satellites with the data requirements for environmental monitoring and research programmes for Europe. The CEC plans to present a draft paper on the work to the November plenary.

### The 1992 CEOS Dossiers

#### **Volume I**

A statement of satellite missions of CEOS members

- a list of missions, status, launch date, orbit, instruments & applications
- alphabetical list of all instruments
- a detailed description of each mission and its instrumentation

(Draft pub. June 1992)

#### **Volume II**

The Relevance of Satellite Missions to Global Environmental Programmes

- a description of international environmental programmes and agencies and their data requirements
- a correlation of satellite measurements with environmental programme requirements
- an analysis of the adequacy of data provision

(Draft pub. June 1992)

#### **Volume III**

Space Agency Ground Segment Infrastructure

- the role and achievements of CEOS working groups with regard to data management
- space agency data reception, processing and archiving facilities
- full details of all space agency products
- space agency catalogues and distribution mechanisms

(Draft pub. December 1992)

## CEOS Activity Plan for 1993

**Akihiro Fujita**

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**S**ince the establishment of CEOS in 1984, this international coordination body has been performing a very active and important role in coordinating in satellite programs among members, and standardizing of data products and data policy.

CEOS will continue and strengthen such activities in 1993.

The areas of CEOS primary interest for 1993 are as follows:

1) Continuation of coordination on Earth observation missions among CEOS members

With long-term Earth observation satellite programs being initiated by CEOS members, it is appropriate to further promote overall coordination of Earth observation satellite missions, instruments and ground segments. CEOS working groups will accelerate their activities to standardize a catalog system, data formats, network systems and to ensure interoperability of data systems being planned by CEOS members.

2) Further strengthening interaction and communications between data "users" and "data providers."

Based on an initiative of UK Prime Minister Major, a dialogue was opened between the space agencies and environmental data users with participation of international global change research organizations. Recent CEOS activities have emphasized reviewing and identifying data requirements for global change research. International global change research organizations are being requested to review the data specification in CEOS Dossier and examine how well their requirements are being met. CEOS Dossier contains detailed information on satellite programs including satellite missions, instruments and ground systems. A CEOS data requirement workshop was planned in May to address the data requirements for global research and other applications. In the meeting, integrated data requirements of international global change research organizations presented and discussed by the research organizations and space agencies was made.

3) Additional volume of "CEOS Dossier"

"CEOS Dossier" is a most important document which contains detailed information on Earth observation programs. At the last CEOS Plenary, it was recommended that an additional volume be prepared to facilitate study of satellite data, such as Earth resources monitoring data. At the Ad Hoc Data Policy Meeting in May, Canada presented an outline of the proposed CEOS Dossier, and CEOS participants will discuss the new volume in the Plenary.

4) Demonstration of data exchange mechanism for global research through pilot project

In accordance with a 1992 plenary meeting action item, a pilot project to implement the data exchange principle

is being planned and finalized in cooperation with the International Geosphere-Biosphere Program (IGBP). At the Ad Hoc Data Policy Meeting in May, the implementation plan for the pilot project was discussed. IGBP presented its data requirements for high-resolution data of HRV/SPOT, TM/Landsat and MESSR/MOS-1.

IGBP and space agencies will develop detailed data requirements and data provision plans and, after coordination, will initiate the data exchange.

5) Adoption of SAFISY Earth Science and Technology projects

In response to a request from the Space Agency Forum for International Space Year (SAFISY), CEOS agreed to adopt and oversee ISY Earth Science and Technology projects if funding agencies agree to continue supporting the projects. CEOS will monitor and report on these projects in the Plenary.

CEOS will see an increasing number of members, observers and affiliates and will truly become a forum for coordination and communication for Earth observation programs.

As the CEOS Plenary host nation for 1993, Japan believes it appropriate to combine the programs of the CEOS members and establish the concept of a worldwide Earth observation satellite constellation. There are many discussions and increasing interest in expanding access to environmental data. In response, CEOS Secretariat proposed to jointly explore the feasibility of a global satellite observation and information network this year.

The global satellite observation and information network conceptually consists of coordinating well worldwide satellite plan and promoting to distribute the satellite observation data through the worldwide network. I hope that the concept should be discussed at the next CEOS Plenary meeting.



## CEOS Data Exchange Principles

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**O**ne primary objective of CEOS is to optimize the benefits of space borne Earth observations through cooperation among the members in the development of compatible data access, products, formats, services, and policies.

CEOS encompasses all civil Earth remote sensing satellite programs. The committee's objectives derive in part from the desire to make it as easy as possible for users to obtain and apply Earth observations data from different satellites for a variety of purposes. Compatible policies and mechanisms for data access and exchange are an integral part of this effort.

To help realize this objective, CEOS began at its 1990 plenary meeting to discuss common data policy principles. Members adopted a change to the CEOS terms of reference to include a specific requirement for members to ensure data availability to the international community. Members also agreed to participate in a series of ad hoc meetings intended to establish general principles covering satellite data policy, and to consider specifically the question of data access. CEOS agencies agreed to begin with global change research use before addressing policy principles for other types of data use.

The CEOS Resolution of Satellite Data Exchange Principles in Support of Global Change Research was adopted at the sixth plenary meeting in 1992 (see next page). As part of the process, CEOS members recognized that individual programs may have different objectives, but that there are shared interests in maximizing data use and supporting research, particularly global change research. The principles reaffirm the commitment of members to non-discriminatory data distribution, the avoidance of any exclusive periods of data access. Members recognized the common goal of providing data to global change researchers on a consistent basis reflecting primarily the cost of filling the user request. It was also recognized that the constraints of mission operations and available resources may require different mechanisms for data exchange/sharing to be found or different programs. CEOS members agreed to implement these data exchange principles to the fullest extent possible.

For global change researchers, the exchange and sharing arrangements will be offered to those researchers chosen through selection procedures, such as research announcements with a peer review or similar process, open to international participation within the context of the research priorities of the relevant global change programs. Global change researchers, jointly with their sponsoring institution, will be required to sign a data agreement stipulating the terms and conditions of data use; and members agreed that all data provided through the CEOS

data sharing and exchange mechanism will be available to other selected global change researchers.

At the third Ad Hoc Data Policy Meeting May 25-27, 1993 in Tokyo, Japan, participants reported on the status of their provision of data for global change research, noting that much data is already available and actively used by global change researchers. With the exception of some data from market-driven systems, these satellite observations are provided by CEOS members to selected investigators on a free or cost of reproduction basis, and the CEOS principles are already successfully being implemented. To evaluate the applicability of these principles for high resolution data that may involve commercial considerations, CEOS is undertaking a data access pilot project in support of core programs of the International Geosphere-Biosphere Program (IGBP).

At the third Ad Hoc Meeting, IGBP identified geographic areas and time periods where data from remote sensing satellites like MOS, Landsat, and SPOT are required to complement analysis already NASDA, NASA, and CNES then presented the basic data policies for their respective satellite programs, and then described the special arrangements that could be offered specifically in support of this CEOS/IGBP pilot project. In the case of MOS and Landsat, the satellite operators have already offered a multi-tier pricing structure to accommodate research requirements. Rights to reproduce the data for sharing among selected investigators is also permitted for global change research for Landsat and MOS. In the SPOT case, CNES currently subsidizes data purchases and provides the data at lower cost for selected researchers. In addition, other CEOS organizations expressed interest in contributing resources to enable provision of data at reduced prices for global change research.

IGBP-DIS was asked to consolidate a requirements document and the data providing agencies agreed to present their respective contribution plans to CEOS and to IGBP-DIS. It was also agreed that, for this project, IGBP would be responsible for selecting the investigators using these data sets. While IGBP has not included requirements for synthetic aperture radar (SAR) data for the specific data access pilot project, SAR data are also being used in other global change research such as deforestation studies under a cooperative program of ESA and the European Communities. SAR data provision could be extended to other global change research activities as appropriate.

For further information on CEOS data policy activities, readers may consult the 1992 CEOS Consolidated Report and minutes of the CEOS plenary and ad hoc meetings, which are available from the CEOS secretariat.

## **Resolution of Satellite Data Exchange Principles in Support of Global Change Research (Draft) 18 May 1993**

Recognizing that the members of CEOS are actively involved in supporting global change/climate and environmental research and monitoring efforts of the international scientific community, as well as pursuing other uses of Earth observations data such as local /regional research, operational environmental monitoring, and commercial;

RECOGNIZING THE INVESTMENTS MADE BY GOVERNMENTS AND INTERNATIONAL AGENCIES IN SUPPORT OF GLOBAL CHANGE/CLIMATE RESEARCH AND ENVIRONMENTAL RESEARCH AND MONITORING AND THE VALUE OF NON-SATELLITE DATA TO THESE PROGRAMS;

TAKING INTO ACCOUNT THAT THE ACQUISITION, PROCESSING, AND SUPPLY OF DATA, ESPECIALLY SPACE DATA, INVOLVE MAJOR INVESTMENTS, AND THAT DATA HAVE VALUE;

RECOGNIZING THAT THESE INVESTMENTS AND VALUES SHOULD BE RESPECTED BY DATA SUPPLIERS AND USERS;

RECOGNIZING THE EXISTENCE OF VARIOUS POLICY AIMS SUCH AS MAXIMIZING THE USE OF THE DATA FROM ALL SOURCES AND SHIFTING THE FUNDING RESPONSIBILITY FOR CERTAIN REMOTE SENSING SYSTEMS TO USERS OR OTHER SOURCES;

Aware that success in global change/climate and environmental research and monitoring requires a continuing commitment to the establishment, maintenance, validation, description, accessibility, and distribution of high-quality long-term data sets, many of which rely on space borne observations;

Anticipating the potential benefits of compatible policies and mechanisms for data exchange in obtaining access to global data;

REAFFIRMING THE COMMITMENT OF CEOS MEMBERS TO THE GENERAL PRINCIPLE OF NON-DISCRIMINATORY ACCESS TO DATA;

RECOGNIZING THE IMPORTANCE OF APPROPRIATE LEGAL REGIMES FOR THE EXCHANGE OF REMOTELY SENSED DATA;

RECOGNIZING THE IMPORTANCE OF APPROPRIATE LEGAL REGIMES FOR THE EXCHANGE OF REMOTELY SENSED DATA;

RECOGNIZING THE COMMON GOAL OF PROVIDING DATA TO GLOBAL CHANGE RESEARCHERS FROM ALL MISSIONS ON A CONSISTENT BASIS REFLECTING PRIMARILY THE COST OF FILLING THE USER REQUEST; RECOGNIZING ALSO THAT THE CONSTRAINTS OF THE MISSION OPERATIONS AND OF AVAILABLE RESOURCES MAY REQUIRE DIFFERENT MECHANISMS FOR DATA EXCHANGE/SHARING TO BE FOUND FOR DIFFERENT PROGRAMS;

CEOS members endorse the following principles relating to SATELLITE data exchange in support of global change/climate and environmental research and monitoring and agree to work toward implementing them to the fullest extent possible. Principles for data exchange in support of other data uses beyond global change/climate and environmental research and monitoring will be developed for CEOS endorsement as a next step.

1. Preservation of all data needed for long-term global change/climate and environmental research and monitoring is required.
2. Data archives should include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
3. International standards, including those generated by the CEOS Working Group on Data, should be used to the greatest extent possible for recording/storage media and for processing and communication of data sets.
4. Maximizing the use of satellite data is a fundamental objective. An exchange/sharing mechanism among CEOS members is an essential first step to maximize use.
5. NONDISCRIMINATORY ACCESS TO SATELLITE DATA BY ALL USERS FOR GLOBAL CHANGE/CLIMATE AND ENVIRONMENTAL RESEARCH AND MONITORING IS ESSENTIAL. THIS SHOULD BE ACHIEVED WITHIN THE FRAMEWORK OF THE EXCHANGE AND SHARING MECHANISMS SET UP BY CEOS MEMBERS.
6. Programs should have no exclusive period of data use. Where the need to provide validated data is recognized, any initial period of exclusive data use should be limited and explicitly defined. The goal should be release of data in some preliminary form within 3 months after the start of routine data acquisition.
7. Criteria and priorities for data acquisition, archiving, and purging should be harmonized.  
(Changes since the last plenary in capital letters.)

## Summary of CEOS Ad Hoc Data Policy Meeting

CEOS Ad Hoc Data Policy Meeting was held in Japan, May 25-26, 1993. The meeting was hosted by the Science and Technology Agency of Japan (STA) and National Development Agency of Japan (NASDA). 37 representatives from 19 agencies attended the meeting.

NASDA reported the start of research use data distribution, as new development in data policy. NASA summarized NASA's data distribution plans for Landsat 4-6 and Landsat 7. Landsat 7 data policy is close to inter-agency agreement.

International Geosphere-Biosphere Program (IGBP) presented data requirements for CEOS data exchange pilot project. CEOS members agreed to support and to provide data of SPOT/CNES, TM/NASA, MOS-1/NASDA. The quantity of data provision and procedures were discussed. The data provision at marginal cost will start after detailed planning.

NOAA proposed to host the an ad hoc data policy meeting for operational/environmental monitoring in spring of 1994.

STA reported the CEOS initiative for G-7 Economic Summit to be held in Tokyo, July 7-9. A draft statement which CEOS secretariat proposed for reflecting to the Summit Economic Communique was reviewed by the members and agreed after some modifications. A draft CEOS brochure in support of the initiative was presented. The brochure will be distributed to Summit member states and CEOS members with a view to helping understand CEOS activities and satellite data applications.

STA proposed a feasibility study on a global satellite observation and information network. As part of it, a ground information network concept was presented. STA/NASDA proposed to formulate CEOS Network Working Group which will address overall requirements for the network.

British National Space Center (BNSC) proposed to draft "CEOS 5-year future plan" and welcomed by the participants.

## Summary of User Requirement Workshop

User Requirement Workshop was held in May 27 to further enhance communications and strengthen interactions between space agencies and international global change research organizations, based on the recommendation from 1992 CEOS plenary.

World Meteorological Organization (WMO) Intergovernmental Oceanographic Commission (IOC) and IGBP presented their data requirements and a draft "CEOS Affiliates Dossier". The efforts for the international global change research organizations to integrate their data requirements was highly commended.

Space agencies (ESA, CNES, NASA, NOAA, NASDA) presented their future earth observation programs.

Discussion between the international global change research organization and space agencies was made. As conclusion of the workshop, it was agreed that a draft "CEOS Affiliates Dossier" needs to be updated by the international global change research organizations from a view point of how much data requirements are being met by the current and future data. The space agencies will review the document for technical feasibilities.

## 1993 CEOS Meeting Calendar

Feb. 1	#1 Secretariat Meeting in Washington DC, USA	May 11-14	WGD in NGDC, Boulder, USA	Sept. 20-24	WG Cal/Val-SAR, Noordwijk, The Netherlands
March 24-26	WGD/FS (Working Group on Data/Format Subgroup) in NCSA, Illinois, USA	May 25-26	Ad Hoc Data Policy Meeting in Tokyo, Japan	Sept. 27-Oct. 1	WGD/NS & CS (Network and Catalog) in NCDC/NOAA, USA
Mar. 29-Apr. 2	WGD/NS & CS (Network and Catalog) in NASDA/EOC, Japan	May 26	#3 Secretariat Meeting in Tokyo, Japan	Oct. 5-6	WGD/ADS (Auxiliary Data) in DLR, Germany
April 4-8	#2 Secretariat Meeting in Graz, Austria	May 27	User Requirement Workshop Meeting in Tokyo, Japan	Oct. 18-20	WGD in ESRIN/ESA, Italy
April 22-23	#1 SAF Meeting in Rome, Italy	May 31-June 1	WG Cal/Val-Infrared/Visible, -Terrain Mapping in Ispra, Italy	Oct./Nov. (TBD)	#2 SAF Meeting in Montreal, Canada
April 28-30	WGD/ADS (Auxiliary Data) in Univ. of Michigan, USA	June 2-4	WG Cal/Val in Ispra, Italy	Nov. 16-18	#7 CEOS Plenary Meeting in Tsukuba, Japan
		July 7-9	G-7 Economic Summit in Tokyo, Japan		
		Sept. 20-21	WGD/FS in ESRIN/ESA, Italy		



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