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SIXTH CEOS PLENARY MEETING
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**Minutes of the
Committee on Earth Observations Satellites
Sixth Plenary Meeting
London, December 9-11, 1992**

THE SIXTH MEETING OF THE COMMITTEE ON EARTH OBSERVATIONS SATELLITES (CEOS) WAS HELD IN LONDON, UNITED KINGDOM, DECEMBER 9-11, 1992, HOSTED BY THE BRITISH NATIONAL SPACE CENTRE (BNSC). IN ADDITION TO THE HOST, THE FOLLOWING ORGANIZATIONS ATTENDED:

- **Members**
 - Canadian Space Agency (CSA)
 - Centre National d'Études Spatiales (CNES)
 - European Space Agency (ESA)
 - Indian Space Research Organization (ISRO)
 - Science and Technology Agency of Japan (STA)
 - National Aeronautics and Space Administration (NASA)
 - National Oceanic and Atmospheric Administration (NOAA)
 - Agenzia Spaziale Italiano (ASI)
 - Deutsche Agentur für Raumfahrtangelegenheiten (DARA)
 - Commonwealth Scientific and Industrial Research Organization (CSIRO)
 - European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)
 - Swedish National Space Board (SNSB)

- **Observers**
 - Canada Centre for Remote Sensing (CCRS)
 - Commission of the European Communities (CEC)
 - Norwegian Space Center (NSC)

- **Affiliates**
 - International Council of Scientific Unions (ICSU)
 - International Geosphere-Biosphere Program (IGBP)
 - Intergovernmental Oceanographic Commission (IOC)
 - World Climate Research Program (WCRP)
 - World Meteorological Organization (WMO)
 - United Nations Environment Program (UNEP)
 - Global Climate Observing System (GCOS)
 - Global Ocean Observing System (GOOS).

In written communiqués, the Brazilian member Instituto Nacional de Pesquisas Espaciais (INPE) and the New Zealand observer Crown Research Institute (CRI) apologized for their inability to attend the Plenary session.

Serving as Chairman, Mr. A. Pryor/BNSC opened the meeting and greeted all the delegates. He welcomed representatives from GCOS and GOOS, who were attending as affiliates for the first time. He greeted the UNEP delegate as well, noting UNEP's first appearance at a Plenary meeting as a CEOS affiliate. Attending as prospective members were representatives from the Russian Space Agency (RSA), the Committee for Hydrometeorology and Environment Monitoring of the Ministry for Ecology and Natural Resources of the Russian Federation (ROSCOMGIDROMET), the Chinese

Academy of Space Technology (CAST), and the National Remote Sensing Center of China (NRSCC). The Belgian Science Policy Office (SPO) attended as a prospective observer (see Document 6-1, Participants List).

ADOPTION OF THE AGENDA

The agenda was adopted as in paper (CEOS, p. 92.1, rev.2). Mr. Pryor noted that two agenda items for the sixth Plenary - the Dossier and affiliate workshop - extend from the interim CEOS Plenary meeting held in April 1992. The data policy discussions extend from the fifth CEOS Plenary held in December 1991. Mr. Gibson/CEC drew the members' attention to the CEC paper, "Issues in Earth Observation Data Policy for Europe," as an important European document relating to the CEOS data policy discussions. It was agreed that the papers would be taken in the following order: items 1, 2, 3, 6, 9, 8, 10, 4, 5, 7, 11, 12.

RECORD OF THE FIFTH PLENARY AND REVIEW OF ACTIONS

The minutes of the fifth Plenary meeting were approved. Dr. Williams/Secretariat noted that all actions from the fifth Plenary have been closed. Dr. B. Smith/NOAA requested that members who have not responded to Action 5-2 need to provide points-of-contact for the Working Group on Data (WGD) Catalog Subgroup.

MEMBERSHIP ISSUES

BNSC had distributed the letters of application from RSA and ROSCOMGIDROMET to all members with the original papers. Late membership applications were also received from CAST and NRSCC (see Document 6-3, Package of Late Papers). All four applicant agencies affirmed in their membership requests their commitment to the CEOS Terms of Reference, including the requirement to make data available on a nondiscriminatory basis to the international community. At Mr. Pryor's invitation, the Chinese and Russian representatives provided summary descriptions of their agencies' roles, responsibilities, and programs. The Plenary approved the membership requests from RSA and ROSCOMGIDROMET. Since the requests from the Chinese agencies had been received late and the organizations were less well-known to CEOS members, these requests were conditionally accepted, pending written confirmation by CEOS members, by February 20, 1993.

ACTION 6-1. New Secretariat to confirm members' approval of the CAST and NRSCC applications for membership.

The Plenary approved the late application for observer status from the Belgian Science Policy Office (SPO), pending written confirmation by members by February 28, 1992.

ACTION 6-2. Secretariat to confirm members' approval of the SPO application for observer status.

A late application was received from the United Nations Office of Outer Space Affairs (UNOOSA) for affiliate status. It was agreed that action on this request be deferred so that members could consider it in light of the requirements for affiliate status.

ACTION 6-3. Secretariat to poll members regarding their position on the UNOOSA's application for affiliate status.

CEOS PROPOSALS

CEOS Secretariat Proposal

Dr. Pfeiffer/ESA summarized the report of the Secretariat task force which considered alternatives for organizing a permanent CEOS Secretariat (see Document 6-3). The task force recommended a Secretariat composed of agency representatives from ESA, NASA/NOAA, and STA/NASDA, who would provide liaison with other CEOS members in their geographic area. The Plenary endorsed the recommendations of the task force, and adopted changes in the CEOS Terms of Reference and the Terms of Reference of the Secretariat. A full description of the task force's recommendations and the new Terms of Reference for CEOS and the Secretariat are contained in the task force report in Document 6-3. The revised CEOS Terms of Reference are attached as Document 6-25.

CEOS Newsletter Proposal

Japan offered to develop a CEOS newsletter, as part of the revised Secretariat duties, to facilitate increased global awareness of space programs. The Plenary endorsed the idea of initiating the CEOS newsletter on a pilot basis, and accepted Japan's offer to assume responsibility for the newsletter.

ACTION 6-4. STA/NASDA to present its plans for the CEOS newsletter before or at the next Plenary meeting.

CEOS Yearbook Proposal

The Plenary adopted the proposal to continue publication of a CEOS yearbook, similar to the document prepared by BNSC last year for the United Nations Conference on Environment and Development (UNCED).

ACTION 6-5. ESA to present for consideration before the next Plenary meeting suggestions as to the form, content, circulation, and pricing requirements for the CEOS yearbook.

1992 CEOS CONSOLIDATED REPORT

The Plenary accepted NASA's submission of the CEOS Consolidated Report.

ACTION 6-6. CEOS members to provide comments and corrections to the CEOS Consolidated Report to Ms. Shaffer/NASA by January 31, 1993.

DATA POLICY

CEOS Data Exchange Principles

Dr. Revah/CNES presented the results of the October 1992 meeting in Paris on data exchange principles, which extended from the 1991 Abingdon meeting. The *ad hoc* meeting on data policy recommended to the CEOS Plenary two primary actions: 1) approval of amendments to the data exchange principles approved at the last CEOS Plenary, and 2) procedures to implement those principles (see Document 6-23). After some discussion, the following revisions to the previously agreed CEOS principles were approved (changes since the last Plenary in capital letters):

Resolution on Satellite Data Exchange Principles in Support of Global Change Research

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 NONDISCRIMINATORY ACCESS TO 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.

Dr. Revah then reviewed three general mechanisms for implementing the CEOS data exchange principles recommended by the delegates to the Paris *ad hoc* data policy meeting. The Plenary endorsed the general mechanisms and, in so doing, agreed that the WGD should accomplish the tasks identified therein. In his report, Dr. Revah presented the proposed approach to implementing Principle 4 that called for: 1) Data providers to submit standard product catalogs to the CEOS International Directory Network (IDN); 2) data requirements to be identified by ad hoc committees of the relevant International Research Programs; 3) selection of global change researchers chosen through peer review or similar process within the context of the research priorities of relevant global change programs; 4) written agreements including protection of data rights and requirements for publication to be signed by selected researchers and their sponsoring institutions; and 5) sharing of data among selected users. The Paris meeting participants also recommended that pilot projects be identified to begin testing the effectiveness of the data exchange principles and procedures to implement them, in particular funding schemes for the purchase of commercial data and provision to selected global change researchers at the cost of filling the request. It was recommended that such a pilot project be initiated, among proposals to be sought from the IGBP/DIS and be managed by a task force led by the CEOS Secretariat. To be representative, this pilot project should involve high resolution as well as other types of data and combine data from space programs managed by Europe, Japan, and North America. The Plenary approved the full set of recommendations for the satellite data exchange principles in support of global change research and introduced minor changes in the general mechanisms for the execution of these principles. These general mechanisms are attached to the present minutes.

ACTION 6-7. WGD to accomplish the tasks contained in the report of the October 1992 *ad hoc* data policy meeting, and inform the Plenary of the status of those activities at the next Plenary meeting.

The delegates considered whether there were further data policy issues that CEOS should consider next. Several members supported the idea of exchanging information about commercial data distribution mechanisms and plans, but noted that it would not be appropriate for CEOS to create data exchange principles for commercial distribution, as there are other forums for such work. The discussion in Paris included preliminary consideration of environmental monitoring and other operational data use, but delegates recommended that this issue be deferred until more agencies are prepared to address it. It was agreed that Japan, as the next CEOS Chair, consider the progress to date in planning the next *ad hoc* data policy meeting for April-May 1993. This meeting would address discussion of implementation mechanisms for the CEOS global change research data policy, including the definition and start of work on a pilot project. Regarding the pilot project, it was suggested that IGBP Data and Information System (IGBP-DIS) efforts to identify high-resolution land data sets with the help of WGD may provide useful experience in implementing the data exchange principles.

ACTION 6-8. STA and the National Space Development Agency of Japan (NASDA) to host a follow-on *ad hoc* meeting on data policy to continue discussion of implementation mechanisms, including the definition and start of work on a pilot project. The proposed schedule is to convene the meeting in April-May 1993, and to report on status at the next CEOS Plenary meeting.

WORKING GROUP REPORTS

Report of the CEOS Working Group on Calibration/Validation

Dr. Susan Till/CCRS summarized the accomplishments of the Working Group on Calibration and Validation (WGCV) (see Document 6-18). A detailed report on WGCV activities in 1992 and plans for 1993 was distributed before the Plenary meeting. The Plenary endorsed the following key recommendations of WGCV:

- Members, affiliates, and observers to support resource requirements to cover attendance and maintain continuity of participation in WGCV and its subgroups. This includes covering the costs of travel and electronic mail communications of WGCV participants.
- Members to consider supporting activities similar to the NOAA and NASA pathfinder data set activities.
- A calibration and validation section to the CEOS Dossier on ground infrastructure should be added. The section could contain an overview of calibration and validation procedures for primary sensors in use, a list of major facilities in use, current and planned calibration and validation campaigns, current and future needs in calibration and validation, and other appropriate points.
- Members, affiliates, and observers to consider establishing a set of permanent ground test sites for multiagency use in long-term sensor calibration and data validation. There is also a need to set up a database on selected test sites once they are established.
- Members, affiliates, and observers to encourage use of CEOS data formats.

Dr. Till will convey other particular recommendations of WGCV to the appropriate agencies.

ACTION 6-9. WGCV to proceed with the task of defining the content of the new calibration/validation section to volume 3 of the Dossier, and to provide a detailed outline through the Secretariat.

ACTION 6-10. WGCV to provide specifications and costs on proposed ground test sites for calibration/validation through the Secretariat.

Report of the CEOS Working Group on Data

Mr. Levin Lauritson/NOAA reported on the accomplishments of the Working Group on Data (WGD) (see Document 6-19). A detailed report on WGD activities in 1992 and plans for 1993 was distributed at the meeting (see Document 6-20). The Plenary endorsed the following key recommendations of WGD for its 1993 program:

- Prepare Directory Interchange Format (DIF) generation plans according to the outline provided; WGD will prepare a consolidated DIF generation plan for CEOS.

- Support by members, affiliates, and observers of travel funding for representatives participating in the CEOS IDN effort, including those from non-CEOS agencies in developing countries where possible.
- Support for the implementation of the Global Land 1-km Base Elevation (GLOBE) Project Plan.
- Encourage members to enter non satellite data into IDN.

ACTION 6-11. WGD attendees of CEOS member agencies to provide DIF Generation Plans to the WGD Chairman by April 15, 1993. WGD to prepare a Consolidated DIF Generation Plan and report progress on this activity at the next CEOS Plenary.

It was noted that CEC began a study on a European Centre for Earth Observations, which will be completed in July 1993; CEC will coordinate these activities with WGD.

AFFILIATE WORKSHOP

CEOS affiliates, representing international and intergovernmental scientific research groups and programs, presented their requirements for global change data and, in some cases, assigned priorities to their requirements. The following is a summary of those requirements.

United Nations Environment Programme

Mr. Gwynne summarized UNEP's most important data requirements. All UNEP activities that involve Earth observation satellite systems are carried out within the United Nations' Earth Watch Program, which is engaged in environmental monitoring and assessment. UNEP's requirements hinge on the Global Environmental Monitoring System (GEMS), a United Nations program to collect information on the environment and natural resources. High-priority data requirements include global coverage, high-quality global change data sets to be used to validate global change models, long time series data, manageable data volumes, reliable sensors, low cost data, and the ability to compare observations from different systems. High spatial resolution is not as important as are other requirements. In the next year, UNEP will be analyzing its requirements further, particularly in the area of terrestrial ecosystems research, and will provide more information to CEOS later. It was noted that UNEP's Global Resource Information Database (GRID) data can be used with other global change research data and can be used to improve user access to data.

International Council of Scientific Unions

Dr. Woods summarized ICSU's data requirements (see Document 6-6). ICSU has its own research programs, including IGBP and the World Data Centers, and is co-sponsoring scientific research programs, such as the World Climate Research Programme (WCRP), and observing system development programs, such as GCOS and GOOS. Over time, the research focus of ICSU programs has evolved from a discipline-specific orientation to a multidisciplinary one, and this was accompanied by requirements for increasing resolution and accuracy. WCRP is looking at atmospheric physics, ocean dynamics, and land physics. Likewise, IGBP is multidisciplinary in that it involves studies of atmospheric chemistry and ocean and land physics, chemistry,

and biology. Requirements for spatial resolution have increased in scale from 1,000 to 100 to 10 km, and requirements for accuracy have increased from 100 to 10 to 1 W/m². These more stringent requirements should be analyzed in terms of the capabilities of remote-sensing systems. The requirement for improved accuracy, in particular, presents technical challenges for space and ground segments.

Global Climate Observing System

Sir John Houghton, chairman of the GCOS Joint Scientific and Technical Committee, described the requirements of GCOS (see Document 6-7). GCOS is concerned with the whole climate system - oceans, atmosphere, land, and the interactions among them - and with improving climate modeling. The key objective of GCOS is to define and specify an operational climate observation system. The CEOS Dossier is a good starting point for identifying GCOS requirements; climate is extensively covered in the current and planned space programs of CEOS members. GCOS relies heavily on sea surface temperature data, such as that provided by instruments on the Earth Remote-Sensing Satellite-1 (ERS-1). Other important measurements are ocean surface parameters, temperature, wind surface stress, and color. There is a need for data to be openly available and provided in a form that enables assimilation of data into climate models. There is also a need to fill the gap between collecting data and feeding it into an operational climate observing system. Other specific needs not addressed in current plans are improved temperature and water vapor profile accuracy and resolution, better precipitation measurements, and enhanced surface wind velocity accuracy and coverage. In addition, current operational programs do not provide tropospheric wind profiles, better tropospheric aerosol data, or global precipitation.

Dr. Houghton invited CEOS participation in GCOS working groups being set up to define and establish GCOS. CEOS is already represented on the GCOS steering committee, and no decision on formal Working Group membership was made. GCOS should request membership where particular skills are required to complete their work.

World Climate Research Program

Dr. Morel provided a two-page chart enumerating WCRP satellite data requirements (see Document 6-8). The success of WCRP depends upon good meteorological observations, especially from the World Weather Watch Program. WCRP needs, in priority order, an upgraded global meteorological observing system; improved data on cloud-radiation feedback; satellite data to complement the surface based network for determining global precipitation and soil wetness; a Global Energy and Water Cycle Experiment (GEWEX) dedicated rain radar; and a set of sensors to provide data necessary for research in ocean dynamics and chemistry, including active microwave scatterometers, multispectral/multidirectional imaging radiometers, and an Ocean Topography Experiment (TOPEX)/Poseidon follow-on altimeter.

World Meteorological Organization

Mr. Hinsman provided a prioritized list of 20 surface parameters and 10 upper air parameters required for maintaining the WMO's global observing system (see Document 6-9). These requirements are to be presented to the next session of the Executive Council in June 1993 for approval. Concerning surface parameters, Mr. Hinsman noted that multi-purpose imagery is most important for many applications; however, many hydrological parameters cannot be determined from space. For upper

air parameters, WMO needs advanced sounders; lack of wind profiling capability in the tropics and over oceans are critical deficiencies. *In situ* measurements are also important for calibration and validation. Sea surface pressure, which cannot be determined through satellite data, is the second most important surface measurement. Wind profiles, the highest priority upper air parameter, are not obtainable from satellite data. To upgrade the global observing system, WMO would need wind profile measurements requiring new lidar sounding techniques, an advanced vertical sounder, and new technology to measure atmospheric pressure. Mr. Hinsman also prepared a list of instrument types that would satisfy the WMO requirements and emphasized that there are many types of instruments required by both WMO and WCRP.

Global Ocean Observing System

Mr. Fleming presented a preliminary summary of requirements for GOOS (see Document 6-10). The GOOS Program proposes to develop an operational ocean observing system. Though still in the planning stage, the first scientific and technical meeting of experts is scheduled for March 1993. Many scientists are participating now in program definition and design. Ocean precipitation and ocean surface salinity are critical measurements, the technical feasibility of which are under study at present. GOOS is particularly concerned with developing and improving data flow and user access to data. TOPEX/Poseidon and Applications and Research Involving Space Technologies Observing the Earth's Field from Low Earth Orbiting Satellite (ARISTOTELES) are key missions for GOOS. Mr. Fleming could not commit to making a list of residual requirements similar to the WCRP/WMO list, as he needs to wait until after the scientific committees meet to gain a better understanding of user requirements.

Intergovernmental Oceanographic Commission

Mr. Withrow summarized IOC's requirements (see Document 6-11), which include needs for atmospheric sounders and a tropical rainfall sensor; improved scatterometers, particularly to derive wind direction; altimeters; ocean color data; and improved passive microwave sensors. There may be data gaps after 1997 because the scatterometer and altimeter were not approved for flight on the 1997 polar platform. Altimeters are required to follow flight of TOPEX/Poseidon and Geosat; ARISTOTELES-type data is needed as well. It also was noted there may be many overlaps among WCRP, WMO, and IOC requirements.

International Geosphere-Biosphere Program

Dr. Rasool described the IGBP program and requirements (see Document 6-12). The IGBP's core projects include a data and information system and research programs in atmospheric chemistry and biology of the land surface and oceans, with global modeling activities that integrate the projects. IGBP priorities center on development of new instrumentation for studying the chemistry of the lower atmosphere, and measuring the physics, chemistry, and biology of the oceans and land. The scale is small and the accuracy requirements are high. The time scale of the measurements must be long term, on the order of decades. For oceans, ocean biology is the highest priority, with sea surface temperature and surface wind field being second and third priorities. For land measurements, vegetation type, structure, and function are the most important; land surface temperature, surface albedo, and surface topography measurements are also needed. Requirements for lower atmosphere data include trace gases and tropospheric aerosols.

Report of the User Meeting in Bonn, November 1992

Mr. von Gadow/German Ministry of the Environment summarized the results of the European Conference on the Use of Satellite Data for Environmental Purposes held November 16-17, 1992, in Bonn, Germany (see Document 6-13). The European Conference was a follow-on to the April 1992 meeting among senior environmental officials and CEOS members. The key product of the conference was a declaration calling for improved coordination with the international community through the CEOS affiliate process and increased involvement of the European Commission in coordinating the requirements of environmental monitoring users whom they represent. A working group will prepare a requirements document comparable to the CEOS Dossier, and a report of the requirements analysis it conducts. The report is expected to identify priorities and potential gaps and complementarity in data to be provided by approved and planned satellite missions. The report is expected to be finished in the autumn of 1993, and a follow-up conference is planned thereafter.

The members welcomed the presentations by the affiliates which provided a useful survey of the activities, data needs, and priority data requirements of global environmental research programs. They also welcomed the intention of the European environmental users to develop their own Dossier of European regional data needs and invited representatives of other regions to do likewise.

CEOS DOSSIER

Dr. Williams summarized the content and status of the three volumes of the CEOS Dossier. The essential purpose of the Dossier is to serve as a basic point of reference for the CEOS Plenary, to help members understand each others' space and ground programs, and to facilitate discussion with user affiliates as to their requirements. The Dossier was prepared with the needs of the user and scientific community in mind, and CEOS will benefit from comments on the Dossier from those groups. Dr. Williams noted that CEOS is collecting the requirements of affiliate users at present; analysis of these requirements is the next step.

Mr. Pryor invited comments on the Dossier, particularly volumes 1 and 2, and whether the structure of volume 3 is a useful one. Many members expressed appreciation for the fine work of BNSC in preparing the Dossier. The members recognized the value of the three-volume Dossier as an operational tool for CEOS members, observers, and affiliates.

Mr. Withrow/IOC suggested that the Dossier be produced on another, less bulky media, perhaps CD-ROM. Dr. Tilford repeated Dr. Revah's point that the science user is the endpoint of the process, and noted that it would be helpful to these users to add descriptions of integrated, long-term data sets, available from CEOS members, to the Dossier. He encouraged the new CEOS members, observers, and affiliates to contribute information on their programs to the Dossier. It was also noted that all parts of the ground segment of CEOS members should be included. It would be impracticable to add the affiliates at this stage.

ACTION 6-12. New members, affiliates, and observers are invited to submit contributions to the Dossier, giving details of their missions and ground infrastructure, by January 31, 1993.

ACTION 6-13. Members, affiliates, and observers to submit factual corrections to the Dossier, particularly amendments to volume 3, by January 31, 1993.

ACTION 6-14. Secretariat to distribute a final version of the first edition of the Dossier by early 1993, and to initiate procedures for its systematic update.

Dr. Duchossois/ESA informed the Plenary of the status of the ESA long-term Earth observation program (see Document 6-14). He noted the November 1992 ESA Ministerial's endorsement of the ESA polar platform program, and described the objectives and payloads of the POEM-ENVISAT and -METOP platforms and the Meteosat Second Generation (MSG) Program, as well as plans for increasing ground segment capabilities. Mr. Morgan clarified that EUMETSAT and ESA have agreed that EUMETSAT will take over long-term continuity of the MSG and METOP polar platform programs.

Mr. Haruyama/NASDA presented the content and status of Japan's long-term Earth observation program (see Document 6-15). One study undertaken by Japan is based on the CEOS Dossier; it involves balancing user requirements with space measurements and space and ground segment plans. Japan's future strategy is based on establishing an ideal international Earth observation system through coordination with appropriate organizations, including CEOS, improvement of the Japanese ground system, tracking local environmental phenomena, and disaster monitoring in the Asia-Pacific region.

Dr. Tilford outlined changes that occurred at NASA since the last CEOS meeting (see document 6-16), including rescoping of the Earth Observing System (EOS) Program, organizational changes, and addition of Landsat to the overall mission. The EOS rescoping reduced the program's budget to 8 billion U.S. dollars through the year 2000 and maintained the June 1998 launch for the EOS-AM1 spacecraft. There will be a common spacecraft bus after the EOS-AM1 platform (i.e., for the EOS-AM2/3, -PM, and -CHEM series). Some science was gained in the rescoping through use of multiple platforms, but the number of instruments decreased. The biggest loss is the High-Resolution Imaging Spectrometer (HIRIS) instrument; however, the addition of Landsat maintains the data rate at about the same level. Regarding the EOS Data and Information System (EOSDIS), a contract will be issued in January 1993 for the EOSDIS Core System. Version 0 is scheduled for completion in mid-1994, and Version 1 by the end of 1996. Dr. Tilford also summarized the impact of the EOS Program rescoping on science and applications requirements.

Dr. Bizzarri/ASI described the Laser Geodynamics Satellite II (LAGEOS II) mission and noted that the next LAGEOS mission has been canceled. He also drew members' attention to a letter to CEOS from Professor Guerriero/ASI. The letter describes the recommendations of the International Workshop on Application of Space Technologies to Disaster Management (see Document 6-17).

DISCUSSION OF AFFILIATE PRESENTATIONS, CEOS DOSSIER, AND ASSESSMENT OF NEEDS AND PRIORITIES

Dr. Williams summarized the process underway to obtain and analyze user requirements in terms of the space and ground segments to be provided by the CEOS system operators (see Document 6-21). The context for the requirements process is the

affiliates' needs for space data. System operators provide satellites, data reception and processing, and data products which flow to the research programs as data input. Research programs process the data, model and assimilate it, and provide information as output. There seems in some instances to be a barrier between transfer of data products by system operators and receipt as data input by the science community.

Extensive discussion ensued on how to balance space and ground segment planning, development, and operations with user requirements. It was generally agreed that user requirements evolve over time, and that CEOS needs to make requirements analysis an ongoing task. Dr. Tilford noted that, in the U.S. and other countries, programs are justified and funded, in part, based on the stated requirements of science users. He felt that CEOS needs to assess integrated user requirements against space and ground assets on an annual basis; this is also one way to maximize the benefits of Earth observations systems. It was noted that the affiliates' requirements up to now have been stated in terms of data and sensors required; it may be more helpful if requirements were stated in terms of measurement needs to accomplish basic scientific objectives. The members could then translate this to sensor and/or new data products as appropriate. It was also noted that the ground segment Dossier begins to provide information about data products and the quality of those products, but the Dossier may need to be refined to specify requirements within specific parameters. In addition, more information is needed about the possible interrelationships among data sets. As a first step, it was decided that the affiliates should assess the adequacy of the data products described in the Dossier and provide comments back to CEOS members.

Mr. Pryor noted that affiliates were not being asked to develop a formal statement of prioritized requirements hammered out at the expense of one science discipline over another; rather, the affiliates were being asked to derive broad concepts and identify areas of overlap in the requirements. Space agencies can improve their programs by taking global user requirements into account, and by addressing data networking and distribution needs across established infrastructures. Dr. Williams agreed and noted that members are trying to identify requirements common to all programs of the affiliates, and those unique to individual programs. Dr. Morel agreed that affiliates should be able to settle on informal guidance concerning user requirements. Dr. Revah suggested that, since the ground segment Dossier describes identified data products based on known user requirements, attention should be focused on future requirements and data products to satisfy them. It was recognized that it is important for the space agencies to evaluate affiliates' requirements against planned systems and provide feedback on deficiencies and overlaps.

ACTION 6-15. Affiliates and observers to consider the definition of data products in volume 3 of the CEOS Dossier and to submit comments to the Secretariat by May 30, 1993. Comments should indicate the extent to which the products meet, or fail to meet, currently identified requirements.

ACTION 6-16. Affiliates and observers to pursue the possibility of greater coordination among themselves in the identification and formulation of their needs in relation to satellite instruments and data flows with a view to presenting a common view at the next CEOS Plenary meeting.

ACTION 6-17. Affiliates and observers to join members in a user requirements workshop to be organized by STA/NASDA, as the incoming CEOS Chair, in mid-1993. The workshop would address future mission priorities and data needs beyond the currently projected generation of missions.

ACTION 6-18. Members to consider the need for further volumes of the CEOS Dossier which might include, for example, research programs other than those related to global environment and applications such as resources management.

ACTION 6-19. Canada to suggest an additional volume of the Dossier for consideration at the next Plenary meeting.

SAFISY PROPOSAL

Mr. Pryor, the Chairman, noted that Minister Hubert Curien, Chairman of the Space Agency Forum on International Space Year (SAFISY), had requested in writing that CEOS take on oversight of ongoing SAFISY Earth science projects from the SAFISY Panel of Experts on Earth Science and Technology, as recommended by the Panel in its final report (see Document 6-3). The IGBP and WCRP representatives noted the scientific desirability of continuing some of the projects.

It was noted by several members and agreed by the Plenary that project funding and decisions on continuing projects remained the responsibility of each CEOS member agency who has undertaken the sponsorship of a specific project. The Plenary agreed that CEOS oversight was appropriate and desirable for continuing projects. This would maintain the link between the projects and space agencies, and would permit CEOS members to coordinate their individual support of such projects as necessary.

ACTION 6-20. Secretariat to develop and circulate an implementation plan for CEOS oversight of SAFISY projects identified for continuation. The plan is to be circulated among CEOS members prior to the next Plenary.

FUTURE MEETINGS

Mr. Maruyama/STA confirmed STA/NASDA's plans to host the *ad hoc* data policy meeting in April-May 1993, and the CEOS Plenary November 15-17, 1993. Professor Stoewer confirmed DARA's interest in hosting the CEOS Plenary in 1994. Dr. Lindberg expressed CSA's interest in hosting the CEOS Plenary in 1995. Dr. Harris expressed CSIRO's interest in hosting the CEOS Plenary in 1996.

LIST OF DOCUMENTS

- 6-1 Participants List
- 6-2 Agenda (CEOS - P. 92.1 rev. 2)
- 6-3 Package of Late Papers
- 6-4 NASA - Land Remote Sensing Policy Act of 1992, Overview and Implementation Status (Tilford)
- 6-5 CEC - Issues in Earth observation data policy for Europe, Report of a working group, December 1992 (Gibson)
- 6-6 ICSU - IGBP Discipline, scale and accuracy (Woods)
- 6-7 GCOS - The Contribution of Satellite Observations to GCOS (report and presentation), and The Global Climate Observing System (brochure) (Houghton)
- 6-8 WCRP - Upgrading the Global Meteorological Observing System (Morel)
- 6-9 WMO - Historical Perspective for WMO Satellite Data Requirements (Hinsman)
- 6-10 GOOS - Global Framework - GOOS (viewgraph) (Fleming)
- 6-11 IOC - IOC Satellite Requirements (Withrow)
- 6-12 IGBP - Global Scale Satellite Data Requirements for the IGBP (Rasool)
- 6-13 European Conference on the Use of Satellite Data for Environmental Purposes on 16 and 17 November 1992 in Bonn (von Gadow)
- 6-14 ESA - ESA Earth Observations Long Term Programme (Duchossois)
- 6-15 NASDA - A Long-term Scenario on Japan's Earth Observation Plan, Report of Committee on Remote Sensing, October 5, 1992 (report and viewgraphs) (Haruyama)
- 6-16 NASA - EOS Program Overview (Tilford)
- 6-17 ASI - Recommendations from the International Workshop on the Application of Space Technologies to Disaster Management and IRIS - LAGEOS II (Bizzari)
- 6-18 CCRS - Report of the CEOS Working Group on Calibration and Validation (Till)
- 6-19 NOAA - Report of the CEOS Working Group on Data to the CEOS Plenary (presentation) (Lauritson)
- 6-20 NOAA - Report of the CEOS Working Group on Data to the CEOS Plenary (report) (Lauritson)

- 6-21 BNSC - Affiliate Research Programme Data Needs from Space (Williams)
- 6-22 Statement Concerning Affiliate Workshop
- 6-23 General Mechanism for the Execution of CEOS Data Exchange Principles
- 6-24 List of Actions
- 6-25 List of Upcoming CEOS Meetings
- 6-26 Revised CEOS Terms of Reference

PARTICIPANTS LIST
Document 6-1

Name	Organization
Dr. B. Bizzarri	Agenzia Spaziale Italiano
Dr. A. Apling	British National Space Centre, DOE
Mr. M. Blackwell	British National Space Centre
Dr. C. Boalch	British National Space Centre
Dr. P. Curtis	British National Space Centre, Met O
Dr. G. Findlay	British National Space Centre
Prof. J. Harries	British National Space Centre, RAL
Ms. C. Losty	British National Space Centre, FCO
Mr. B. Plummer	British National Space Centre, MOD
Mr. A. Pryor	British National Space Centre
Mr. B. Purcell	British National Space Centre, NERC
Mrs. H. Shotter	British National Space Centre
Dr. G. Thomas	British National Space Centre
Mrs. L. Toora	British National Space Centre
Dr. D. Williams	British National Space Centre
Mr. L. Bronstein	Canada Centre for Remote Sensing
Dr. S. Till	Canada Centre for Remote Sensing
Dr. G. Lindberg	Canadian Space Agency
Dr. H. Teunissen	Canadian Space Agency, AES
Mrs. M. Chevrel	Centre National d'Etudes Spatiales
Dr. I Revah	Centre National d'Etudes Spatiales
Prof. P. Houren	Chinese Academy of Sciences
Mr. Y. Weiyuan	Chinese Academy of Space Technology
Mr. P. Churchill	Commission of the European Community/JRC
Mr. R. Gibson	Commission of the European Community/EEA
Dr. R. Klersy	Commission of the European Community/JRC
Mr. C. Nicholas	Commission of the European Community
Mr. M. Paillon	Commission of the European Community
Mr. A. Bedritsky	Committee for Hydrometeorology and Environment Monitoring, Russia
Mr. A. Karpov	Committee for Hydrometeorology and Environment Monitoring, Russia
Dr. G. Harris	Commonwealth Scientific and Industrial Research Organization
Mr. A. Langner	Deutsche Agentur fuer Raumfahrtangelegenheiten
Dr. W. Mett	Deutsche Agentur fuer Raumfahrtangelegenheiten
Mr. M. Otterbein	Deutsche Agentur fuer Raumfahrtangelegenheiten
Prof. H. Stoewer	Deutsche Agentur fuer Raumfahrtangelegenheiten
Dr. von Gadow	Deutsche Agentur fuer Raumfahrtangelegenheiten

Mr. M. Dillon	ESYS
Dr. S. Howells	ESYS
Dr. A. S. Whitelaw	ESYS
Ms. S. Garcia-Castaner	European Organisation for the Exploitation of Meteorological Satellites
Mr. G. Lafeuille	European Organisation for the Exploitation of Meteorological Satellites
Mr. M. J. Lafeuille	European Organisation for the Exploitation of Meteorological Satellites
Mr. J. Morgan	European Organisation for the Exploitation of Meteorological Satellites
Mr. J. Arets	European Space Agency
Mr. G. Duchossois	European Space Agency
Mr. P. Goldsmith	European Space Agency
Mr. H. Hopkins	European Space Agency
Mr. L. Marelli	European Space Agency
Mr. B. Pfeiffer	European Space Agency
Dr. D. Croom	Global Climate Observing System
Sir J. Houghton	Global Climate Observing System
Dr. N. Flemming	Global Ocean Observing System
Mr. K. Sridhara Murthi	Indian Space Research Organization
Mr. J. Withrow	Intergovernmental Oceanographic Commission
Dr. J. D. Woods	International Council of Scientific Unions
Dr. S. I. Rasool	International Geosphere-Biosphere Program
Dr. P. Williamson	International Geosphere-Biosphere Program
Dr. Y. Miyazaki	Ministry of International Trade and Industry
Dr. V. Saito	Ministry of International Trade and Industry
Mr. M. Yokota	Ministry of International Trade and Industry
Mr. P. Backlund	National Aeronautics and Space Administration/Y
Ms. M Blazek	National Aeronautics and Space Administration/ ESSO
Mr. G. Lutz	National Aeronautics and Space Administration
Ms. L. Shaffer	National Aeronautics and Space Administration/Y
Dr. S. Tilford	National Aeronautics and Space Administration/Y
Mr. W. Turner	National Aeronautics and Space Administration/IRD
Mr. J. V. Zimmerman	National Aeronautics and Space Administration
Dr. J. Hussey	National Oceanic and Atmospheric Administration
Mr. L. Lauritson	National Oceanic and Atmospheric Administration
Dr. J. Neilon	National Oceanic and Atmospheric Administration
Dr. B. Smith	National Oceanic and Atmospheric Administration
Mr. Z. Xintie	National Remote Sensing Centre, China

Mr. Y. Haruyama Mr. S. Yoshitomi	National Space Development Agency of Japan National Space Development Agency of Japan
Mr. G. Rosenberg Mrs. G. D. Strom	Norwegian Space Centre Norwegian Space Centre
Mr. Z. Haiping	Office of State Space Leading Group of China
Mr. Y. Milov Mr. Y. Zonov	Russian Space Agency Russian Space Agency
Mr. T. Maruyama	Science and Technology Agency of Japan
Mr. M. Verbauwhede Mrs. M. Wagner	Science Policy Office, Belgium Science Policy Office, Belgium
Mr. D. Mitchell Dr. Z. Stott Mr. R. Sweet Mr. S. Ward	Smith Systems Engineering Smith Systems Engineering Smith Systems Engineering Smith Systems Engineering
Prof. L. Quan	State Science and Technology Commission, China
Mr. C. G. Borg	Swedish National Space Board
Mr. M. D. Gwynne	United Nations Environment Program
Dr. P. Morel	World Climate Research Program
Dr. D. Hinsman	World Meteorological Organization

**REVISED AGENDA (CEOS P.92.1 rev.1)
Document 6-2**

Committee on Earth Observations Satellites
Sixth Plenary
December 9-11, 1992
London, United Kingdom

1. Adoption of the Agenda CEOS P.92.1
2. Record of the 5th Plenary CEOS P.92.2
3. Membership Issues CEOS P.92.3
4. New Initiatives CEOS P.92.4
 - i. Secretariat Proposal
 - ii. Newsletter
 - iii. Yearbook
5. 1992 CEOS Consolidated Report CEOS P.92.5
6. Data Policy: Report on the Paris Meeting, October 1992 CEOS P.92.6
 - i. Proposed amended Principles
 - ii. Paper on General Mechanisms
7. CEOS Working Group Reports CEOS P.92.7
 - i. Working Group on Calibration/Validation
 - ii. Working Group on Data (including subgroups) CEOS P.92.8
8. Affiliate Workshop
 - i. Presentations from:
 - UNEP
 - ICSU
 - GCOS
 - WCRP
 - WMO
 - IOC
 - GOOS
 - IGBP
 - Report of the "User" Meeting in Bonn, November 16-17
 - ii. Discussion of Needs and Priorities
9. CEOS Dossier:
 - i. Volume I Satellite Mission already circulated
 - ii. Volume II Global Environmental Programmes already circulated
 - iii. Volume III Ground Infrastructure
10. Discussion and proposed revision of Dossier in the light of comments and the Affiliate Workshop

11. Future Meetings

1993	Japan
1994	Germany
1995	?

12. AOB

STATEMENT CONCERNING AFFILIATE WORKSHOP
Document 6-22

CEOS

- recognised the value of the 3 volumes of the dossier as an operational tool for CEOS members and affiliates.
- invited new members, affiliates and observers to submit contributions by January 31, 1993 to the dossiers giving details of their own missions and ground infrastructure arrangements.
- agreed that members, affiliates and observers should send by January 31, 1993 any factual corrections as a matter of urgency to the Secretariat, including in particular amendments to the newly distributed Volume 3.
- invited the Secretariat to distribute a "final" version of the first edition of the Dossier early in 1993 and to initiate procedures allowing the Dossiers to be systematically updated thereafter.
- welcomed the presentations by the affiliates which provided a useful overview of the activities, data needs and priority data requirements of global environmental research programmes.
- invited the affiliates and observers to:
 - (i) consider the definition of data products in Volume 3 of the CEOS dossier and to submit by May 30, 1993 comments to the Secretariat on the extent to which the products meet, or fail to meet, their currently identified requirements.
 - (ii) pursue the possibility of greater coordination among themselves in the identification and possible formulation of their needs in relation to satellite instruments and data flows with a view to presenting a common view to the next CEOS Plenary meeting.
 - (iii) join with CEOS members and observers in a Workshop to be organised in mid-1993 which would address future mission priority and data needs beyond the currently projected generation of missions.
- welcomed the intention of European Environmental users to develop their own dossier of European regional data needs and invited representatives of other regions to do likewise.

- agreed to consider the question of further volumes of the CEOS dossier which might include, for instance, research programmes other than those related to global environment, applications such as resources management etc., and welcomed the offer by Canada to suggest options for further consideration within CEOS.

**GENERAL MECHANISM FOR THE EXECUTION OF CEOS DATA EXCHANGE
PRINCIPLES IN SUPPORT OF GLOBAL CHANGE RESEARCH
Document 6-23**

Principles 1 and 7. In coordination with ad-hoc committees of the various relevant international programmes (e.g. IGBP, WCRP, HDP, GCOS, GOOS, WWW, IGOSS, UNEP, etc.) CEOS members should define and disseminate data management plans addressing where and how long-term global change data are being acquired and preserved, and the procedures and criteria for continued data acquisition, retention, and purging. The objective is to establish an informal "clearinghouse" function through CEOS for satellite-based observations, coordinated with other relevant data management organizations, to optimize the collective development and maintenance of critical data and information. Before a CEOS member purges a data set, he should notify other CEOS members to see if such a data set is of interest and could be maintained by another custodian. Through the international directory network (IDN) effort already underway in the CEOS Working Group on Data (WGD), regular updates will be easily accessible concerning data acquisition.

The CEOS Plenary should direct the CEOS WGD to define a process for providing a compilation and integration of data management plans in a broader context through the CEOS WGD.

Principle 2. Through the CEOS WGD catalog subgroup, standards have been proposed for what information needs to be included in a directory. The Directory Interchange Format (DIF) defines the minimum content and format for such information, and the prototype international directory is already in place to permit agencies and users to use and evaluate the system.

The WGD catalog subgroup should be encouraged to continue its work and address guide and inventory level standards and interconnectivity as well. The existence of all data sets should be documented on international directory networks.

Principle 3. The Consolidated Report on CEOS will summarize the recommendations to date regarding data product format standards, catalog systems, and other areas. In addition, other organizations, such as the Consultative Committee on Space Data Systems (CCSDS), the International Standards Organization, etc. are conducting work on standards that should be taken into account. In order to facilitate international exchange of data, and integration of data from multiple sources, use of standards will be extremely important.

CEOS members should seek to agree on common standards that meet their programmatic requirements and should commit to offering data and products in agreed CEOS standards where such exist.

Principle 4:

a. Catalogue of Available Standard Data

Each data provider (normally a CEOS member) will provide a catalogue of the standard products available for each system and include such information in the CEOS IDN.

b. Identification of Data Sets

Data requirements should be identified by ad hoc committees of the various international research programmes related to global change (such as WCRP, IGBP, HDP, etc.) on the basis of their priorities and against criteria of key needs and/or continuing core measurements requirements. These requirements should be coordinated among relevant programmes in forums such as the workshop held during the 1992 CEOS Plenary.

Data sets should be selected from among the standard products as defined by the data providers and within volumes compatible with their capabilities and their available resources. *(However, it was also recognized that standard products in catalogues may not match the science requirements.)*

These data sets may originate from any system or instrument, whether experimental, operational, or commercial.

c. Selection of Global Change Researchers

Global change researchers will be chosen through selection procedures, such as research announcements with a peer review or a similar process. These selections will be made at a national level or under cooperative intergovernmental programmes, within the context and framework of the research priorities of the recognized international or national global change programmes. Review teams should be open to international participation. The selection procedures should be designed in such a way as to be able to integrate new research teams on a short notice. Particular emphasis should be placed on encouraging participation for developing countries and other non-CEOS participants.

d. Written Agreements

Selected global change researchers should, jointly with their institution, formally sign on a written agreement, including prohibition on redistribution and commercial use if required by the data provider, and a requirement for publication of all results and methods in the established scientific literature.

e. Sharing of Data among Selected Users

All data provided through these mechanisms will be available to other selected global change researchers as well as the original recipients.

ACTIONS FROM SIXTH CEOS PLENARY
Document 6-24

ACTION 6-1. New Secretariat to confirm members' approval of the CAST and NRSCC applications for membership.

ACTION 6-2. Secretariat to confirm members' approval of the SPO application for observer status.

ACTION 6-3. Secretariat to poll the members regarding their position on the UNOOSA's application for affiliate status.

ACTION 6-4. STA/NASDA to present its plans for the CEOS newsletter before or at the next Plenary meeting.

ACTION 6-5. ESA to present for consideration before the next Plenary meeting suggestions as to the form, content, circulation, and pricing requirements for the CEOS yearbook.

ACTION 6-6. CEOS members to provide comments and corrections to the CEOS Consolidated Report to Ms. Shaffer/NASA by January 31, 1993.

ACTION 6-7. WGD to accomplish the tasks contained in the report of the October 1992 *ad hoc* data policy meeting, and inform the Plenary of the status of those activities at the next Plenary meeting.

ACTION 6-8. STA and the National Space Development Agency of Japan (NASDA) to host a follow-on *ad hoc* meeting on data policy to continue discussion of implementation mechanisms, including the definition and start of work on a pilot project. The proposed schedule is to convene the meeting in April-May 1993, and to report on status at the next CEOS Plenary meeting.

ACTION 6-9. The Plenary directed WGCV to proceed with the task of defining the content of the new calibration/validation section to volume 3 of the Dossier, and to provide a detailed outline through the Secretariat.

ACTION 6-10. The Plenary directed WGCV to provide specifications and costs on proposed ground test sites for calibration/validation through the Secretariat.

ACTION 6-11. WGD attendees of CEOS member agencies to provide DIF Generation Plans to the WGD Chairman by April 15, 1993. WGD to prepare a Consolidated DIF Generation Plan and report progress on this activity at the next CEOS Plenary.

ACTION 6-12. New members, affiliates, and observers are invited to submit contributions to the Dossier, giving details of their missions and ground infrastructure, by January 31, 1993.

ACTION 6-13. Members, affiliates, and observers to submit factual corrections to the Dossier, particularly amendments to volume 3, by January 31, 1993.

ACTION 6-14. Secretariat to distribute a final version of the first edition of the Dossier by early 1993, and to initiate procedures for its systematic update.

ACTION 6-15. Affiliates and observers to consider the definition of data products in volume 3 of the CEOS Dossier and to submit comments to the Secretariat by May 30, 1993. Comments should indicate the extent to which the products meet, or fail to meet, currently identified requirements.

ACTION 6-16. Affiliates and observers to pursue the possibility of greater coordination among themselves in the identification and formulation of their needs in relation to satellite instruments and data flows with a view to presenting a common view at the next CEOS Plenary meeting.

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ACTION 6-19. Canada to suggest an additional volume of the Dossier for consideration at the next Plenary meeting.

ACTION 6-20. Secretariat to develop and circulate an implementation plan for CEOS oversight of SAFISY projects identified for continuation. The plan is to be circulated among CEOS members prior to the next Plenary.

UPCOMING CEOS MEETINGS
Document 6-25

February 1993	Format Subgroup-5, USA
March 29-30, 1993	Network Subgroup-4, Hatoyama, Japan
March 31-April 2, 1993	Catalog Subgroup-10, Hatoyama, Japan
April-May, 1993	Ad Hoc Data Policy Meeting, Japan
May 11-13, 1993	Working Group on Data-14, Boulder, CO, USA
Mid-1993	User Requirements Workshop
June 1993	Working Group on Calibration/Validation-7, Italy
Fall 1993	Working Group on Data-15, Frascati, Italy
September 1993	Network Subgroup-5, Asheville, NC, USA
September 1993	Catalog Subgroup-11, Asheville, NC, USA
November 15-17, 1993	Seventh CEOS Plenary, Japan
Spring 1994	Catalog Subgroup-12, Germany
Fall 1994	Working Group on Data-17, Ottawa, Canada

**CEOS TERMS OF REFERENCE
Document 6-26**

Committee on Earth Observations Satellites (CEOS)

Preamble

Remote sensing from space has evolved from an early period of limited satellite programs to a point where distinctions among existing missions result from the technology employed, rather than from the disciplines served in system operations. In the future, a number of international and national spaceborne Earth observations systems will operate simultaneously and support both interdisciplinary and international activities.

The organization of international cooperation in spaceborne Earth observations systems also is evolving, from mission-specific reviews to the interdisciplinary coordination of multi-mission programs. Beginning with the first Multilateral Meeting on Remote Sensing held in Ottawa on May 8-9, 1980, which was attended by agency representatives from Canada, the European Space Agency (ESA), France, India, Japan, and the U.S., current and potential operators of Earth observations systems have met several times to discuss the means by which mutually beneficial cooperation and coordination could be achieved in both the near and longer term. As a result of these gatherings, the recent past has seen the creation of the Coordination on Land Observation Satellites (CLOS) by agency representatives from France, Japan, and the U.S. in Paris on November 13-14, 1980; the initiation of CORSS in Paris on May 10-11, 1982, through the efforts of agency representatives from ESA and Japan; and the second Multilateral Meeting on Remote Sensing, held in Paris on May 12-13, 1982, attended by agency representatives from France, Canada, ESA, India, Japan, and the U.S.

This framework of initial discussion and cooperation has enhanced the utility of spaceborne Earth observations data to users worldwide, has encouraged the coordination of program plans among spaceborne Earth observations system operators, and has fostered international receptivity to and acceptance of spaceborne Earth observations system activities and applications.

Consequently, the assembled representatives of international and national spaceborne Earth observations systems affirmed the following:

AWARE of the overlap of spaceborne Earth observations mission objectives and of the interdisciplinary applications of remotely sensed data, RECOGNIZING the advantages of ongoing communication and cooperation among spaceborne Earth observations system operators, and DESIRING to promote the international growth and potential benefits of spaceborne observations of the Earth, CEOS members have affirmed the value of the activities described above and have agreed to coordinate informally their current and planned systems for Earth observations from space through the organization of a Committee on Earth Observations Satellites (CEOS).

Cooperation in the development and management of remote-sensing and associated data management programs can be of benefit to operators of spaceborne Earth observations systems and to users of Earth observations data. Redundancy among systems and the utility of data can be optimized through the appropriate coordination of complementary and compatible space and ground segments, data management practices and products, and Earth observations systems research and development.

CEOS will not supersede current or potential agreements by members. Participation in the activities of CEOS will not be construed as being binding upon spaceborne Earth observations system operators, or as restricting their right to develop and manage Earth observations systems according to their needs.

Objectives

CEOS has three primary objectives:

- To optimize the benefits of spaceborne Earth observations through cooperation 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 coordination of space-related Earth observations activities, including those related to global change
- To exchange policy and technical information to encourage complementarity and compatibility among spaceborne Earth observations systems currently in service or development, and the data received from them; issues of common interest across the spectrum of Earth observations satellite missions will be addressed.

Individual members of CEOS will use their best efforts to implement CEOS recommendations in their respective Earth observations programs.

Participants

Members

Governmental organizations that are international or national in nature and are responsible for a civil spaceborne Earth observations program currently operating, or at least in Phase B or equivalent of system development, will be eligible for membership in CEOS. Members must have a continuing activity in spaceborne Earth observations, intended to operate and provide non-discriminatory and full access to data that will be made available to the international community. The addition of members will be with the consensus of current members of CEOS. Requests for membership should be addressed to the Chairperson of the next scheduled CEOS Plenary session. Such requests will be considered by the members at that meeting.

Observers

Governmental organizations that are international or national in nature and currently have a civil space-segment activity in Phase A/pre-Phase A or equivalent of system development, or a significant ground-segment activity that supports CEOS objectives, may be invited to participate through the status of observer. Addition of observers will be by consensus of existing members. Observers may participate in CEOS Plenary and Working Group discussions, and have their views included in reports; however, approval by observers will not be required to establish consensus.

Affiliates

CEOS will establish links to other existing satellite coordination groups and to scientific or governmental bodies that are international in nature and currently have a significant programmatic activity that supports CEOS objectives by inviting them to become formally affiliated with CEOS. Affiliates may participate, as appropriate, in the CEOS Plenary and Working Group meetings, and have their views included in reports; however, approval by affiliates will not be required to establish consensus. The autonomy of both the affiliated organizations and the respective national and international Earth observations programs will remain intact. Membership in CEOS does not automatically assume membership in the respective affiliated organizations. Addition of affiliates will be by consensus of existing members.

Cooperative Activities

CEOS members will exchange technical information on and pursue the potential for coordination of space and ground segments. Such coordination could include discussions on current and future mission parameters, sensor capabilities and intercalibration, and data and telemetry downlink characteristics. In addition, Earth observations systems coordination within CEOS could address issues of ground station technical compatibility for backup satellite tracking, command and control, and sensor and telemetry data reception.

CEOS members will investigate the means for increasing data utility and cost-effectiveness, for both operators and users. CEOS activity could include the coordination of data acquisition, sampling, and pre-processing methodologies; the standardization of data formats where appropriate; the increase in compatibility of data archives; and the enhancement of user access to CEOS member databases, information products, and services. CEOS members will seek to ensure that the user community is made aware of the satellite programs of members and will encourage discussions between the users and the relevant satellite system operators, as necessary.

CEOS members will present their plans for emerging satellite remote-sensing technologies and programs, and will discuss appropriate approaches for the coordination of future systems. CEOS members will address current developments and future directions/opportunities in Earth observations from space, including free-flying spacecraft, mission-specific instruments flown on space transportation systems, and the placement of instruments on space platforms.

Organizations and Procedures

CEOS will convene once every year in Plenary session. Each member will designate a point-of-contact for coordination between meetings. CEOS meetings will be organized and chaired by the designated host organization. A standing Secretariat will be maintained by ESA, NASA/NOAA, and STA/NASDA in support of the CEOS Plenary. Each year's incoming Plenary host agency will participate in and closely collaborate with the Secretariat for that year. The Secretariat will prepare and distribute the minutes for the Plenary meetings, serve as a point of contact for external organizations interacting with CEOS, maintain and update the CEOS dossier on space and ground segment activities, produce other periodic publications, ensure communications among members between meetings, report at each Plenary session on its activities and the status of action items from previous Plenary meetings, and perform other tasks as assigned by the CEOS Plenary. The chairpersons of the CEOS Working Groups will be invited to all meetings of the CEOS Secretariat and will be copied on all relevant correspondence. The Plenary guides the work of the Secretariat, with CEOS member points of contact serving as a steering committee in between Plenary sessions. At each meeting of CEOS, the time, place, and host for at least the next two meetings will be established. A list of members, affiliates, and observers and the dates they were accepted will be updated as appropriate, included as Appendix A to the Terms of Reference, and distributed with the minutes after each meeting.

CEOS also may establish, as mutually agreed and on an ad hoc basis, special temporary Working Groups to investigate specific areas of interest, cooperation, and coordination and to report at subsequent Plenary meetings. Continuation of each ad hoc Working Group requires confirmation at each Plenary session. Conclusions resulting from CEOS Plenary sessions, or the findings and recommendations of ad hoc Working Groups, will be acted upon at the discretion of each CEOS member.

CEOS may establish, as mutually agreed, standing Working Groups where an ad hoc status is deemed insufficient. More permanent status may be required to ensure long-term continuity of work in certain areas where the magnitude and complexity of the task is not suitable to short-term solutions. These standing Working Groups shall continue without requiring specific confirmation by the Plenary. The Chairpersons of such groups shall report at each CEOS Plenary session on accomplishments and future plans. If the consensus of the Plenary is that such a group is no longer required, the Plenary may discontinue the group. In the absence of such a decision, however, the standing Working Group shall continue. Representatives from all CEOS members are invited to participate in all Working Groups.

CEOS will replace the Multilateral Meeting on Remote Sensing, CLOS, and CORSS. During the development of and action on CEOS activities, the member agencies of CEOS will follow the example of the successful international technical and programmatic cooperation achieved by the Coordination on Geostationary Meteorological Satellites. CEOS members also will consider the issues, concepts, and conclusions arrived at in previous gatherings of the Multilateral Meeting on Remote Sensing, CLOS, and CORSS, and will address current and future activities of spaceborne Earth observing systems.

CEOS will consider and may make recommendations and agree on actions to promote appropriate coordination across satellite coordination groups, and national and international satellite programs. Furthermore, CEOS encourages its members to maintain communication as appropriate with other groups and organizations involved in spaceborne Earth observations activities and applications through the relevant channels within their respective governments.

Adoption and Amendment

These Terms of Reference were adopted at the September 24-25, 1984, meeting of CEOS and were amended by consensus at the second meeting of CEOS, held at the European Space Research Institute (ESRIN) in Frascati, November 10-12, 1986. Additional amendments were made at the third meeting of CEOS in Ottawa, Canada, April 4-5, 1989, at the fourth meeting in Sao Jose dos Campos, Brazil, November 13-14, 1990, and at the sixth meeting in London, United Kingdom, December 9-11, 1992. They may be further amended by consensus of the members.

Adopted 9/25/84
Washington, DC

Amended 11/11/86
Frascati, Italy

Amended 4/5/89
Ottawa, Canada

Amended 11/14/90
Sao Jose dos Campos, Brazil

Reconfirmed 12/10/91
Washington, DC

Amended 12/11/92
London, United Kingdom

CEOS Membership

Organization	Location	Date of Membership
Members		
Canadian Space Agency (CSA)	Canada	1984
Centre National d'Etudes Spatiales (CNES)	France	1984
European Space Agency (ESA)	Europe	1984
Indian Space Research Organization (ISRO)	India	1984
Instituto Nacional de Pesquisas Espaciais (INPE)	Brazil	1984
Science and Technology Agency (STA)	Japan	1984
National Aeronautics and Space Administration (NASA)	U.S.	1984
National Oceanic and Atmospheric Administration (NOAA)	U.S.	1984
British National Space Centre (BNSC)	U.K.	1986
Agenzia Spaziale Italiano (ASI)	Italy	1986
Deutsche Agentur für Raumfahrtangelegenheiten (DARA)	Germany	1986
Commonwealth Scientific and Industrial Research Organization (CSIRO)	Australia	1989
European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)	Europe	1989
Swedish National Space Board (SNSB)	Sweden	1991
Russian Space Agency (RSA)	Russia	1992
Committee for Hydrometeorology and Environment Monitoring (ROSKOMGIDROMET)	Russia	1992
Chinese Academy of Space Technology (CAST)	China	1993
Observers		
Norwegian Space Centre (NSC)	Norway	1990
Canada Centre for Remote Sensing (CCRS)	Canada	1990
Crown Research Institute (CRI)	New Zealand	1990
Commission of European Communities (CEC)	Europe	1991
Belgian Office of Science and Technology (BOST)	Belgium	1993
National Remote Sensing Centre of China (NRSCC)	China	1993
Affiliates		
International Council of Scientific Unions (ICSU)	France	1991
International Geosphere-Biosphere Program (IGBP)	Sweden	1991
Intergovernmental Oceanographic Commission (IOC)	France	1991
World Climate Research Program (WCRP)	Switzerland	1991
World Meteorological Organization (WMO)	Switzerland	1991
United Nations Environment Program (UNEP)	Kenya	1992
Global Climate Observing System (GCOS)	Switzerland	1992
Global Ocean Observing System (GOOS)	France	1992