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Report from the 10th CEOS Plenary

Brian J. J. Embleton

Head, CSIRO Office of Space Science and Applications (COSSA)



CEOS Mural

Aboriginal artist Les Huddlestone designed the mural, and supervised its completion by delegates at the 10th Plenary meeting of the Committee on Earth Observation Satellites in Canberra, 13-15 November 1996.

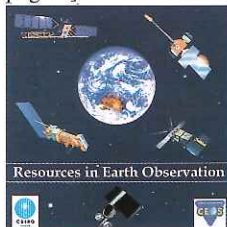
Turtles, goannas, fish and water lilies represent the natural environment, the preservation of which is a key objective of many Earth Observation programs. Also shown is Mirrabooka, the Southern Cross, which guides both humans and animals, as well as inspiring the search for knowledge. The pathways leading to Australia bear footmarks painted by the delegates and illustrate the international nature of remote sensing.

Les Huddlestone was originally from Roper River, Northern Territory, and was commissioned by COSSA for this work, approximate size 2m by 6m, natural ochre and acrylic paint on canvas.

10th CEOS Plenary

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) of Australia hosted the CEOS 10th Plenary from 13 to 15 November, in Canberra. About 100 delegates from thirty countries and organisations attended the meeting, the first Plenary to be held in Australia.

One of the main pre-occupations for delegates was to consider the role of satellites - together with local or "in situ" measurements - in future global observing systems. As a result of the meeting, two task teams were established to assist in the development of an "integrated global observing strategy", IGOS. The Strategic Implementation Team, led by myself, will develop a broad strategy for the step-wise implementation of the space component of IGOS. The Analysis Group, led by Mr. Yukio Haruyama of NASDA, will comprise both provider and user representatives, and will examine how existing and foreseen space missions correspond with the anticipated needs of users. [See article on page 3]



CSIRO Chief Executive, Dr. Malcolm McIntosh, launched a new CD-ROM during the Plenary. "Resources in Earth Observation", published by CSIRO on behalf of CEOS, contains case studies, data sets, lesson plans, scientific texts and other information on the social

value of Earth observation. We hope that the disk will be especially useful in schools and developing countries around the world. [See article on page 4]

Delegates to the Plenary thanked Dr Susan Till of CCRS, and Mr Levin Lauritson of NOAA, former chairs of the Working Groups on Calibration and Validation; and the WG on Data, respectively, for their outstanding work on behalf of CEOS over a long period.

The 10th Plenary also featured several technical demonstrations and special events, described below.

High Speed Computing

The CEOS plenary included a three-part presentation from Dr John Lilleyman of CSIRO about high speed network transfer and processing of satellite information.

1) Warping. Using eight alpha workstations linked over Australia's 155Mbs experimental broadband network, an AVHRR image downloaded in real time from the web was processed to a standard map projection.

2) Progressive image transfer. Instead of waiting for an entire satellite image to download across the Web from Beijing, as soon as a recognisable outline is visible, users can select only the area of interest, which then continues to download high resolution data. Unhighlighted areas of the satellite image remain in low resolution and do not acquire any further data.

3) Terrain flythrough. Dr Lilleyman also demonstrated a simulated fly-through of the Canberra landscape. The high performance computer network processed first a 25m resolution colour IRS-1C image of Canberra, combining it, a 3D view, and a 6m black and white image of the same area, to a common map projection. After further virtually instantaneous processing, the monitor displayed an accurate and recognisable 3D simulation of the Canberra district, seen as if from an aircraft a few hundred metres from the ground.

Dr Lilleyman's presentation illustrated the dual importance of the World Wide Web and high speed parallel processing for satellite-data users. Previously, even users with fast networks would have endured inconvenient waits for data delivery, then processing on a single machine would have taken days, weeks, or longer; processing for the CEOS computing demonstration occurred in seconds.

Data management networks, like the one demonstrated at the Plenary in Canberra, will enable researchers around the world to share the same observations. Users will be able to preview, order, and use data stored anywhere in the world.

Moving Window Display

The CEOS Plenary also included the world's first real-

(to be continued on Page 3)



CEOS and IGOS - The Way Forward

Lisa R. Shaffer

Mission to Planet Earth Division, Office of External Relations, NASA HQ

The 10th CEOS Plenary devoted a significant amount of time to discussion of an integrated global observing strategy (IGOS) and how CEOS might contribute to the development of the space component of such a strategy.

The starting points for the discussion were the outcome of the Seattle Ad Hoc CEOS meeting on the Space Component of an integrated global observing strategy (IGOS) [reported in the last CEOS Newsletter] and a meeting held in Geneva in September 1996 on In Situ Observations for the Global Observing Systems. The CEOS Plenary endorsed the recommendations from the Seattle meeting and took note of the relevant draft recommendations from the Geneva meeting. There was consensus that continued attention should be given within CEOS, and through interaction with other involved and important international organizations, to continue work toward achieving such a strategy. The recommendation from Seattle to establish a study team was addressed through the creation of an IGOS Strategic Implementation Team (SIT). Plenary participants agreed that CEOS can make the most effective contribution to the IGOS in the areas of the space component and the surface-based observations necessary for calibration and validation. The purpose of CEOS activities in this regard is to develop a space component of the IGOS that satisfies user requirements. The SIT will report to the 1997 Plenary with a review of its progress and recommendations as appropriate.

In support of IGOS development, and other CEOS interests, the Plenary also accepted a recommendation to establish an Analysis Group to evaluate the extent to which existing and planned systems of CEOS agencies meet the defined user requirements, both of CEOS affiliate organizations and other national and regional user groups.

CEOS agencies felt it is important to proceed quickly in these activities to demonstrate early the ability to identify and resolve deficiencies, so that areas needing political and funding support can be identified and addressed. Although activities will focus on long-term plans, it was thought important to consider aspects of existing programs and missions that could be identified to realize early progress toward the IGOS.

The Strategic Implementation Team will address implementation of the space component of the IGOS by developing an overall vision for the IGOS space component and a methodology for resolving deficiencies in observations and products. The team is open to participation of all Members, Observers, and Affiliates, but should include senior agency representatives with knowledge of national and agency plans and policies, and authority to commit to changes in major programs that may be necessary to realize the IGOS. The team will prepare recommendations to the Plenary as to how changes could be implemented to realize the IGOS. The team will rely, in part, on the output of the Analysis Group. Dr. Embleton, of CSIRO, agreed to serve as chair of the Strategic Implementation Team.

The Plenary accepted NASA/NOAA's offer to host the

first meeting of the Strategic Implementation Team in the area of Long Beach, California, USA on 6-7 February 1997. The Team will develop a broad strategy for the stepwise implementation of the IGOS Space Component. In doing this, the Team will need to address the relationship between research and operational data, as well as the space/surface-based linkages. The strategy for the space component obviously has to be consistent with, and interconnected to, the strategy for the non-space component. This will also require interaction with appropriate groups beyond CEOS.

At the first SIT meeting, Terms of Reference will be adopted, which should encourage substantive discussion on key issues to guide IGOS strategic planning. Implementation strategies must be relevant to national and international research/operational/applications programs and reflect agency priorities. The first meeting will review and move forward in discussion of

- a vision for IGOS
- definition and responsibilities of the space component of an IGOS
- addressing the interface between strategy definition for the space component and the in situ component with appropriate mechanisms for seamless integration
- dialogue with the Analysis Group
- an initial implementation strategy
- involving the space component
- for CEOS overall (Members, Observers and Affiliates)
- consideration of the CEOS SIT initiative and its impact on other national and international co-ordinating bodies
- a work program (prototypes) in consultation with the Analysis Group

Agreement in CEOS to establish the Strategic Implementation Team is an important recognition by all the world's Earth observation space agencies and affiliated international organizations of the importance of more intensive planning and more effective international coordination. This work can enhance the benefits of space-based Earth observation by helping to ensure that critical global measurements are obtained and sustained to support a wide variety of operational and research uses.

The CEOS Planning and Analysis Task Force Completes Its Work.

CEOS concluded the work of the Task Force on Planning and Analysis, chaired by Bizzarro Bizzarri. This Task Force defined and completed implementation of a database version of the CEOS "dossier" with detailed specifications of satellite and instrument specifications and performance, with a companion and compatible database of requirements from the CEOS Affiliate organizations, along with tools for analyzing the extent to which space agency programs address user requirements. The final details of the database implementation should be resolved by early 1997. At the CEOS Plenary meeting, Dr. Bizzarri, of EUMETSAT and the Task Force Chair, provided some examples of the user requirements and capabilities contained in the CEOS

database and described the database. Dr. Bizzarri reported that it is now possible to compare user requirements and instrument performances to see how well requirements are met. The Plenary agreed that, pending resolution of some technical issues, the data base will be released for general use early in 1997, and CEOS agencies agreed to continue refining the information from their programs that is contained in it. ESA has agreed to continue to support maintenance of the Dossier database. The Analysis Group will work with CEOS agencies to ensure ongoing quality assurance of the content of the data base.

The Plenary thanked Dr. Bizzarri and the other Task Force members for their dedicated work during the past two years.

CEOS Establishes New Analysis Group.

At the 10th Plenary, CEOS agencies agreed to establish a new Analysis Group, comprising both provider and user agencies, to address how well existing and planned space missions, programs, and products satisfy foreseen user requirements. User requirements to be addressed will include those of the Affiliates and those of Members' and Observers' nations and agencies. The analysis is to identify deficiencies and suggest changes that could resolve them. The Analysis Group will work closely with the IGOS Strategic Implementation Team (SIT). The Analysis Group is open to all Members, Observers, and Affiliates.

Mr. Yukio Haruyama, of STA/NASDA, agreed to serve as Chair of the Analysis Group. Mr. John Morgan, chairman of the Global Observing Systems Space Panel (GOSSP), will serve as the Affiliates' point of contact for the group, in addition to direct participation by Affiliate representatives.

The purpose of the Analysis Group is to supply CEOS agencies and the SIT with an analysis that can be taken into account in individual agency plans and can be used by the SIT to develop recommendations for coordinated CEOS agencies' action to address gaps and undesirable overlaps in observing programs. The Analysis Group will use the CEOS data base, developed by the former CEOS Task Force on Planning and Analysis, as a key reference for its work.

The first meeting of the AG is planned for March 1997 in Europe, but much work is already underway to develop the Terms of Reference, coordinate with the SIT, and coordinate a draft work plan. Workshops are planned for July 1997 in Japan and September 1997 in the U.S. leading to a report at the 1997 CEOS Plenary in Toulouse.

(continued from Page 1)

10th CEOS Plenary

time intercontinental relay of satellite information. The Hatoyama ground station near Tokyo instantly relayed incoming data from the Japanese ADEOS satellite, to a screen at Canberra's National Convention Centre. ADEOS was launched on 17 August from Tanegashima Space Centre. Mr Chu Ishida of NASDA presented the demonstration; as ADEOS orbited south over Russia and down the Asian east coast, the image on the Canberra viewscreen kept updating, making the viewer feel they were on the satellite looking down at Earth.

Catalogue Displays

In addition to the two main CEOS demonstrations, CSIRO and the Cooperative Research Center for Advanced Computational Systems arranged continuous web-catalogue demonstrations. Space agencies from China, India, and Japan showed how processed satellite images could be viewed, ordered, and downloaded across the World Wide Web. Australia's Bureau of Meteorology also displayed the Australian Integrated Forecasting System.

Commemorative mural

Participants in the 10th Plenary - the first to be held in Australia, and only the second in the southern hemisphere - helped Aboriginal artist Les Huddleston to create a permanent reminder of the occasion, by painting a commemorative mural, the large three-part canvas (total size about 2m X 5 m). A map-like effect showed the international nature of space co-operation, and the different paths taken by representatives from different parts of the world to reach the Plenary.

Other Outcomes

Apart from its internal business, the 10th CEOS Plenary agreed to encourage use of interferometric Synthetic Aperture Radar, including for validation; and to develop contact with commercial agencies. CNES, the French Space Agency, was confirmed as the next Chair, to be followed by the Indian Space Research Organisation in 1998 and EUMETSAT in 1999.



The 10th CEOS Plenary in Canberra



News from the Working Group on Information Systems and Services

Helen M. Wood, Director, Office of Satellite Data Processing and Distribution, NOAA/NESDIS

Jean Schiro-Zavela, International and Interagency Affairs, NOAA/NESDIS

The CEOS Working Group on Information Systems and Services (WGISS) held its third meeting in October. At the 10th CEOS Plenary, held shortly afterwards, the WGISS Chair highlighted WGISS activities during its first year. The Plenary members had the opportunity to see the results of two WGISS activities led by CSIRO: the CEOS Network Demonstration and the CEOS educational CD-ROM.

WGISS-3 was held at Neustrelitz Remote Sensing Ground Station in Germany on October 8-10, 1996, hosted by DARA and DLR. Helen Wood, WGISS Chair, welcomed the 38 participants from 18 CEOS agencies. The accomplishments and plans of the WGISS Task Teams, User Panel, and Subgroups were reviewed during the meeting, and WGISS approved a new Data Interoperability Task Team, led by Wyn Cudlip (BNSC/DERA), to investigate network access to data in multiple formats.

Strategy Task Team

Hiroshi Kikuchi (STA/NASDA), WGISS Vice Chair and leader of the WGISS Strategy Task Team, outlined an approach for the Task Team's work, beginning with the description of a generic global system architecture for data location and access, comprised of the information systems and services of CEOS agencies. This task is intended to ensure a good tie between a "top down" strategic focus and a "bottom up" task level focus to guide future WGISS planning. The first meeting of the Strategy Task Team will be held in May 1997, immediately prior to WGISS-4.

User Panel

Gerard Szejwach (IGBP), WGISS Vice Chair and Chair of the User Panel, proposed plans for the Panel's activities, which include monitoring WGISS tasks to help ensure that they address the requirements of a diverse user community, and facilitating user involvement in WGISS tasks. As a first step, he is working with the User Panel Liaison from each WGISS Subgroup on a survey to assess Subgroup tasks, focusing on current user involvement in each task and user requirements being met by each task.

Access Subgroup

Terry Fisher (CCRS), Access Subgroup Chair, reported that Release B of the Catalog Interoperability Protocol will be available in January 1997, which will permit the on-line ordering of data from disparate catalog systems. The World Wide Web Task Team will host a workshop on February 4-6, 1997, regarding the use of Web technology to provide access to Earth observation/geo-referenced data, including access to data in multiple formats (in conjunction with the Data Subgroup Vice Chair). The "Yellow Pages" Task Team produced the first edition of the "Worldwide Directory of On-Line Services for Earth Observation Data Users."

Data Subgroup

Gunter Schreier (DARA/DLR), Data Subgroup Chair, reported that the Global Land One-km Base Elevation project is working towards publication of its data set in 1997. A preliminary version containing topographic data from only the U.S. Defense Mapping Agency (now the National Imaging and Mapping Agency) was published on CD-

ROM in 1996. Along with ongoing activities involving ocean color and 1 km AVHRR data, the Subgroup is considering the stimulation of the development of other global auxiliary data sets, such as an aerosol reference data base. The Global Mapping Task Team is working to reduce spatial distortion problems caused by projecting the Earth's sphere onto a two-dimensional map, partly by introducing innovative mapping schemes.

Network Subgroup

Richard desJardins (NASA), Network Subgroup Chair, reported on recent successes in which performance testing led to dramatically improved network performance on key communications lines between CEOS agencies. WGISS endorsed the concept of a "Virtual CEOSnet" comprised of existing and near-term planned bilateral and Internet links, as a practical approach to meeting the needs of CEOS-approved projects.

Natural Hazards and Emergency Response

The objective of the Natural Hazards and Emergency Response Task Team, led by Miriam Baltuck (NASA), is to establish mechanisms to get relevant satellite-derived information about disasters to emergency organizations in time to be used in their response and relief activities. The first meeting of this Task Team was on January 16-17, 1997, following the NASA co-sponsored "Conference on GIS and Applications of Remote Sensing to Disaster Management."

Network Demonstration at the 10th Plenary

At the 1996 Plenary, CSIRO's network demonstration [see article about the 10th CEOS Plenary, page 1] provided Plenary members with a graphic example of the potential benefits to users of the work pursued by WGISS: increasing access to data and metadata, assisting the interuse of disparate data, and fostering the networks needed to carry the data.

Educational CD-ROM

The "Resources in Earth Observation" CD-ROM, another WGISS activity led by CSIRO, was released at the 10th Plenary. It is designed to help teachers and students - particularly users in developing countries - learn about remote sensing of the Earth from space. The CD-ROM contains sample data, case studies, lesson plans, background text, glossaries, and points of contact for additional data and information. When used with a Web browser, the CD-ROM provides working links to relevant Internet resources maintained by CEOS agencies and others world-wide. Copies of the CD-ROM are available for \$20 (Australian) from the Information Officer, CSIRO Office of Space Science and Applications, GPO Box 3023, Canberra ACT 2601, Australia, fax +61-6-216-7222.

Future Meetings

The next WGISS meeting (#4) will be held May 14-16, 1997, hosted by CCRS in Ottawa, Canada. WGISS-5 will be held the week of October 19, 1997, hosted by ISRO in Bangalore, India. For more information, please contact Helen Wood, WGISS Chair, at hwood@nesdis.noaa.gov or fax +1-301-457-5184, or Jean Schiro-Zavela, WGISS Secretariat, at jschiro-zavela@nesdis.noaa.gov or fax +1-301-736-5828.

A new three year work programme for the CEOS Working Group on Calibration and Validation

Alan Belward

European Commission, DG-Joint Research Centre, Space Applications Institute, 21020 - Ispra (VA), Italy

The 10th CEOS Plenary Meeting endorsement of the concept of an Integrated Global Observing Strategy (IGOS) and the modification of the CEOS Terms of Reference to authorise broader participation by CEOS Affiliates and Observers, have great significance for the CEOS Working Group on Calibration and Validation (WGCV).

WGCV was also encouraged by Plenary to address Cal/Val recommendations from the IGOS related In Situ Observations meeting of September 1996 in Genève. These were that the Global Observing Systems Space Panel should develop a scheme for identifying priorities in validation issues, and that on the basis of these priorities WGCV should consider developing pilot project(s) to address issues such as measurement protocols, test regimes and data management.

These Plenary decisions formed the focus for the working group's latest meeting, WGCV12, kindly hosted by DARA and DLR-DFD at Oberpfaffenhofen, Germany 4th to 6th December, 1996. The meeting saw the development of a new three year work plan. This follows the actions, guiding principles and recommendations of the WGCV's Strategic Vision Document. The preliminary elements of the new work plan are described below.

A new WGCV web site

The WGCV secretariat hosts and maintains a new world wide web (WWW) site at:
<http://www.eos.co.uk/ceos-calval>

This contains background material, contact details for members and links to non-CEOS sites dealing with calibration and validation issues. The goal is for the WGCV web site to become a first port of call for anyone seeking Cal/Val information.

The site is being expanded to list conferences. New introductory material is being prepared, and a slide set providing generic Cal/Val examples is being prepared; slide sets related to specific Cal/Val topics will follow. The web site will also contain key references and reference sites as compiled by the four WGCV sub-groups. Copies of WGCV newsletters will be available. Finally minutes of the latest WGCV meetings, including WGCV12, are available.

2. The WGCV Dossier

This dossier provides information on calibration laboratories, on test sites and instruments in a uniform way. The dossier development, led by NASA, will continue over the next three years. The Dossier can be found at:
<http://sps0.gsc.nasa.gov/calval/homepage.html>.

3. Linkages to non-CEOS Groups

To improve liaison with organisations lacking CEOS representation, WGCV will invite individuals to meetings as technical experts. The WGCV's Infrared and Visible Optical Sensors (IVOS) sub group, which met the two days prior to WGCV12, set a precedent with an excellent presentation from the UK National Physics Laboratory on new advances in instrument calibration.

Representation from developing countries is particular-

ly important for validation, where local expertise is needed world-wide. The WGCV recognises that funding for participation may be a problem. However, it was felt that if invitations were made in the context of special sessions, funding may be easier to find. WGCV will invite experts from developing countries in this context, and CEOS Affiliates will be asked to identify relevant individuals. Most WGCV subgroup meetings already feature one specialist session, and all subgroup chairs agreed that this will continue.

4. Co-ordination and implementation of validation activities.

WGCV12 debate concerning validation began with the Geneva meeting recommendations. These are largely paralleled by recommendations made in the WGCV's Strategic Vision Document. Firstly, that WGCV should form ad hoc groups with common interests in the validation of specific parameters and encourage inter-comparison of parameters derived from different instruments. Secondly that WGCV should compile a list of validation data sets and activities which should receive priority.

WGCV12 concluded that validation will form a focus for our work over the next three years, and at least in the near-term, work will continue within the four subgroups.

Priority parameters must be identified. This list must consider existing activities as the costs of international validation exercises is high. The Geneva recommendation that the Space Panel provide such a list should be expanded to include all CEOS Members, Affiliates and Observers. However Affiliates should strengthen their involvement in the WGCV activities. The priority list should recognise that not all parameters are at the same level of maturity. In this light WGCV12 participants identified seven pilot projects which will be used to analyse issues such as accuracy requirements, measurement and sampling protocols, test site(s), data management requirements and implications for all CEOS participating organisations. Parameters include Visible/Near-Infrared Top-of-Atmosphere reflectance (these are a critical first step to creation of derived parameters such as Leaf Area Index); Sea Surface Temperature validation; intercomparison of Digital Terrain Model generation from optical and microwave data; Wind Speed; Significant Wave Height; Wave Frequency and Wave Direction.

Conclusions:

The new work plan represents a significant expansion of activity concerning validation. However, the pilot projects build on previous WGCV actions and on proposals for project work by CEOS agencies represented in WGCV. The three year work plan will build on the results of these projects, will certainly adapt to the evolving IGOS and will evolve to best serve the needs of the international community. My thanks go to all those who participated in WGCV12.



International Cooperation in Ocean Colour

Trevor Platt & Venetia Stuart

Bedford Institute of Oceanography (Canada)

The International Ocean-Colour Coordinating Group (IOCCG) was established during 1996 under the auspices of the Intergovernmental Oceanographic Commission (IOC), following a resolution endorsed by the Committee on Earth Observation Satellites (CEOS).

The group held its first meeting in Toulouse (France), March 22 & 23, 1996, producing an interim set of Terms of Reference. The Executive Committee of the IOCCG met in Washington, DC (USA), December 5 & 6, 1996, and took the decisions necessary to found a Project Office related to this initiative. The activities of the IOCCG are dependent upon financial contributions from national space agencies and other groups, and upon infrastructure support from the IOC.

The aims of the International Ocean-Colour Coordinating Group, as articulated at its first meeting (Toulouse, 1996), are as follows:

- Foster expertise in using ocean-colour data (training)
 - Encourage the use of ocean color data, particularly in developing countries, through training courses, workshops and international symposia as well as exchange of in situ data and software tools for data access and processing.
- Provide a common voice for the user community
 - Develop a consensus among users on key issues related to satellite-ocean-colour science and technology, and communicate the collective view to the appropriate international bodies and space agencies.
- Advocate the importance of ocean-colour data to the global community
 - Through workshops, conferences and other appropriate information systems, demonstrate the importance of ocean colour data to the global community.
- Optimize quality of data, facilitate merging and access to data
 - Promote the formation of an international calibration and validation network for ocean colour and ensure that sea-truth measurements conform to accepted international protocols.
 - Encourage agencies to agree on common formats for data exchange, common data products and algorithms.
 - Facilitate access to ocean-colour data and ancillary data.
- Advocate the collection of essential ocean and atmosphere data
 - Identify key variables relevant to the application of ocean-colour data, and recommend data-collecting strategies to fill existing gaps in time and space.

Terms of Reference

With these goals in mind, the group adopted the following interim Terms of Reference. They will be finalised at the next meeting of the IOCCG, which will be held in Tokyo, March, 1997.

1. To serve as a communication and coordination channel between data providers and the global, user community of satellite-ocean-colour data, and so to maximize the benefits that accrue from international investments in ocean-colour science and technology.
2. To construct a partnership, at the international level, between the space agencies and the users of satellite-ocean-colour data to develop and coordinate data utilization.
3. To work closely with the appropriate international bodies (including CEOS, IOC and SCOR), international scientific programs (such as IGBP and GOOS), satellite-ocean-colour-mission offices and other agencies (such as environmental and fishing agencies) to harmonize the international effort and advance ocean-colour science and its applications.
4. To develop a collective voice for the community of users of ocean-colour data and to articulate this voice to the appropriate international bodies, international scientific programs and space agencies.
5. To promote the long-term continuity of satellite ocean-colour data sets; the development of operational, ocean-colour data services and new generations of ocean-colour sensors; and the integration of data from complementary ocean sensors.

Project Office

Effective January 1, 1997, a Project Office for the IOCCG will be set up at the Bedford Institute of Oceanography, in Halifax, Nova Scotia, Canada. It will be supervised by Dr. Trevor Platt, Chairman of the IOCCG, and staffed, initially, by a half-time Project Scientist (Dr. Venetia Stuart) under contract to the IOC Secretariat (UNESCO, Paris). The office can be reached by telephone (1-902-426-3793); by fax (1-902-426-9388); or by e-mail (tplatt@is.dal.ca). The remote-sensing officer at the IOC Secretariat is Mr. John Withrow (telephone 33.1.45.68.40.08; fax 33.1.45.68.58.12; email j.withrow@unesco.org).

One of the first activities of the Project Office will be to establish a presence on the World-Wide Web, intended to provide a comprehensive Internet resource on ocean colour: the address of the server will be announced in the near future.

Successful Launch of ADEOS

Yukio Haruyama

ADEOS Program Manager, NASDA

The Advanced Earth Observing Satellite (ADEOS) was successfully launched at 10:53 (JST)/(01:53 (UT)) on August 17, 1996 by H-II Flight No. 4 from the Tanegashima Space Center.

ADEOS is an international Earth observation platform which carries NASDA's Ocean Color and Temperature Scanner (OCTS) and Advanced Visible and Near-Infrared Radiometer (AVNIR), NASA's NASA Scatterometer (NSCAT) and Total Ozone Monitoring Spectrometer (TOMS), CNES's Polarization and Directionality of the Earth Radiation (POLDER), Interferometric Monitoring of the Greenhouse effect gases (IMG) of the Japanese Ministry of International Trade and Industries (MITI), and the Improved Limb Atmospheric Spectrometer (ILAS) and Retroreflector of Space (RIS). The launch was delayed for 24 minutes due to a launch vehicle sensor problem. Approximately 150 foreign guests from the ADEOS participating agencies observed the launch.

The critical phase of ADEOS ended after the 22nd orbit on August 19. NASDA then began the initial on-orbit check-out of the bus system and the mission instruments. The initial mission check-out continued for approximately 90 days, and after which ADEOS was declared ready to enter the routine operation phase on November 26.

The mission objective of the ADEOS is to accumulate knowledge and understanding necessary to solve the Earth environment issues, especially problems related to global warming, ozone depletion, and terrestrial environmental change. To investigate global warming, ADEOS will observe the elements related to energy circulation and carbon circulation. It will also observe the ozone variation, especially in polar regions, to facilitate understanding the mechanism of the ozone dynamics and related chemical process. In the terrestrial environmental change area, ADEOS instruments will monitor global vegetation distribution and its variation. It also will observe the snow and ice extent and its relation with climate change. ADEOS instruments will provide new data such as global chlorophyll distribution by OCTS, atmospheric temperature and humidity profile and greenhouse effect gases by IMG, and polarization and directionality data by POLDER.

On-orbit check-outs of the mission instruments were conducted in parallel with the initial orbital control which placed the spacecraft into the planned orbit at an altitude of 800 km. The first images were widely reported by major newspapers. These images are accessible on the ADEOS home page (<http://www.eorc.nasda.go.jp>). In the check-out operations, anomalies were found with ILAS and IMG, but they were solved and all the mission instrument check-outs were completed by October 10.

ADEOS is the first mission of the International Earth Observation System (IEOS) which consists of Earth observation satellites of Japan, US and Europe. ADEOS data will be widely available to any users based on the IEOS Data Exchange Principles (DEP) which have been agreed upon by the IEOS participating agencies for the access and

use of the data from the IEOS missions. ADEOS data will be available at the lowest possible cost for research and non-commercial operational use for public benefit. In the field of meteorology and fishery, ADEOS NSCAT and OCTS data will be used on a near-real time basis via a network maintained by Japan Meteorological Agency (JMA) and NOAA for numerical weather forecasting; the OCTS data will be used by NOAA for coastal environmental monitoring and by Japan Fishery Information Center (JAFIC) for fishing ground forecasting. NSCAT data will be widely used by many meteorological agencies around the world. The network is also widely used for access by Principal Investigators (PIs) and other users.

NASDA currently distributes OCTS and AVNIR data to PIs for calibration and validation. On December 10, an anomaly was found in the OCTS tilt mechanism which tilts the scanning mirror in the spacecraft flight direction to decrease the effects of sun glitter on the image data. The tilt mechanism was fixed at 0 degrees on December 17 for the time being while an investigation is underway.

ADEOS provides a variety of data products to users, ranging from radiometric and geometric processed standard data to value added products. The data should be accurate to increase its utility. Most of the mission instruments are in the calibration and validation phase, and their data are available to PIs. NASDA is conducting calibration and validation of AVNIR and OCTS using aircraft, ocean buoys, and in-situ data from the JMA and the Fishery Agencies. NASDA plans to release the AVNIR data and OCTS data to general users in April and June respectively. Other instrument data will also be made available to users from NASDA and individual instrument providers.

NASDA would like to express its sincere appreciation to the agencies and personnel who support this important mission.



CNES is Chairing CEOS in 1997

Gérard Brachet, Scientific Director, CNES

CNES (Centre National d'Etudes Spatiales), the French Space Agency, has taken over the chairmanship of CEOS from CSIRO at the end of the 10th plenary meeting held in Canberra, 13-15 November 1996. CNES has been involved in Earth observation activities for thirty years, starting with small geodesy satellites in 1966 and 1967, and a first data collection and location satellite system (EOLE) used for tracking drifting balloons in 1971, in cooperation with NASA. CNES also initiated and conducted the first studies of the European METEOSAT satellites, which became a European-wide program in 1971. More recently, CNES has initiated a series of high resolution optical imaging spacecraft for land surveying purposes called the SPOT satellites, three of which are already in orbit (SPOT-1, 1986, SPOT-2, 1990, SPOT-3*, 1993) and has set up a commercial company, SPOT IMAGE, to market their data and associated services. The SPOT program includes participation from Belgium and Sweden, who are also involved in the exploitation of the system. Two more satellites are planned: SPOT-4, due for launch in early 1998, and SPOT-5, planned for 2002. The SPOT-4 spacecraft will also carry a new instrument called "Vegetation". This new instrument, funded in part by the European Union, will contribute a major set of well calibrated data dedicated to global monitoring of the vegetation cover over land masses, of direct relevance to the Integrated Global Observing Strategy presently discussed within CEOS. CNES is also very actively involved in ocean circulation studies through its participation in the TOPEX-POSEIDON program, in cooperation with NASA, and recently initiated a follow-on satellite altimetry program, called JASON, which will take over from TOPEX-POSEIDON by the end of 1999. JASON is also a joint CNES-NASA program. The global ocean altimetry data sets resulting from these two satellites should provide a major contribution to understanding the role of oceans in the dynamics of climate changes. CNES is also a long term partner of the NOAA polar orbiting satellite system through the provision of the on board equipment and exploitation of the ARGOS data collection and location system (DCS), in operation since 1979. This system provides an operational

locating service for thousands of small transmitters used in drifting buoys, balloons and hydrological stations, and even marine animals. An upgraded version of the ARGOS data collection and location system will be operated on board NASDA's ADEOS-II spacecraft in 1999. In addition to these major programmes in Earth observation, CNES is also funding and managing the development of specific instrumentation such as the POLDER instrument on board ADEOS (also planned on ADEOS-II), the SCARAB Earth radiation budget instrument on board Russian Meteor spacecraft, and the DORIS high accuracy tracking system used on the TOPEX-POSEIDON, ENVISAT and JASON satellites. It is presently developing an advanced atmospheric sounder (IASI) for the futur European polar orbiting meteorological satellites METOP/EPS, with the support of Eumetsat. CNES is funding research and application demonstration projects within the French scientific community and has developed close links with user organizations such as METEO FRANCE, the French weather service, IFREMER, the French oceanographic research and exploitation agency, and many other partners. It also conducts a number of Earth observation activities in international cooperation, such as the recent demonstration project for SPOT data reception at the Obninsk station, near Moscow in Russia.

CNES has been a CEOS member from the beginning and participated in the precursor committee CLOS (Committee of Land Observation Satellites) as early as 1980. CNES is proud to chair CEOS in 1997 and is looking forward to hosting the 11th plenary meeting in Toulouse on 19-21 November 1997.

*SPOT-3 failed in November 1996

Contributions for future issues of the CEOS Newsletter from the CEOS Members, Observers and Affiliates, and subscriptions to the CEOS Newsletter, please contact:

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Meeting Calendar

As of Jan. 1997

Activities	1996		1997										
	November	December	January	February	March	April	May	June	July	August	September	October	November
CEOS Plenary level	▲13-15 10th Plenary CSIRO/Canberra, Australia												▲19-21 11th Plenary CNES, Toulouse
CEOS WGISS (Working Group on Information Systems & Services)								▲14-16 WGISS-4 CCRS, Ottawa Canada	△ WGISS/GCOS Workshop			▲21-24 WGISS-5 ISRO, Bangalore India	
Subgroups Task Teams			▲16-17 Hazards TT	▲4-6 WWW TT Workshop		▲13-18 SG Meetings CNES, Toulouse	▲12-13 Strategy TT CCRS, Ottawa						
CEOS WGCV (Working Group on Calibration and Validation)		▲4-6 WGCV 12 DLR, Germany ▲2-3 IVOS						▲3-5 Workshop on Winds & Wave Geoph. Val ESTEC, Holland			▲3-5 WGCV 13 Shanghai, China		
IGOS/SIT (Strategic Implementation Team)				▲6-7 SIT NOAA, Irvine, Calif									
CEOS AG (Analysis Group)			▲23-24 CEOS/ Data base Meeting Geneva		▲24-25 AG-1 EUMETSAT Germany				▲22- AG-2, AG/GOSSP Workshop, IGOSSP Japan		▲AG-3 USA		
Others					▲17-19 IOCCG Tokyo		▲20-22 IGAC Toronto Canada		△ GCOS Data Panel Singapore		▲22-27 GCOS/ JSTC-VII	▲6-10 IAF Turin, Italy	▲14-18 IGFA Plenary USA

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

CEOS-related meetings are open only to designated participants.

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