

**Minutes of the
Committee on Earth
Observation Satellites
Tenth Plenary
Meeting**

**Canberra, Australia
13-15 November 1996**

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1. INTRODUCTION

The tenth CEOS Plenary meeting was held at Canberra, Australia on 13-15 November 1996. The meeting was hosted by CSIRO, the 1996 CEOS Chair. Representatives from 17 Members, two Observers, and eight Affiliates attended. In addition, representatives from 17 organisations attended as part of delegations or as guests of the CEOS Chair. (See Appendix 1, a summary of attending organisations; Appendix 2, a list of Plenary action items; Appendix 3, a list of Plenary Documents; Appendix 4, a list of acronyms; Attachment 10-1, Plenary participants.)

2. OPENING REMARKS

Dr. Embleton, of CSIRO, opened the meeting. He said the Plenary meeting was an opportunity to review the progress of CEOS work and to decide whether to accelerate, modify, expand, or concur on activities. It was also an opportunity to share plans and visions and to inform others of agency programs and events. He noted that an important CEOS attribute is to work in harmony to enhance CEOS' impressive level of international cooperation.

Dr. Zillman, of the Australian BoM and President of the WMO, welcomed the participants. He said that the WMO may serve as a useful example for CEOS to consider in its discussions of an integrated global observing system. The most powerful of WMO's contributions are international cooperation and open sharing of data. Early on, WMO recognised the need for pursuing an integrated approach to its activities. There is increasing recognition of the interdependencies among disciplines and between space-based and in situ observing approaches, and this is the product and driver of development in Earth remote sensing.

The agenda (document 10.1.1), which was circulated for review prior to the meeting, was adopted.

3. RECORD OF THE NINTH CEOS PLENARY

Dr. Lindberg, of CSA, the 1995 CEOS Chair, reported on last year's Plenary activities. The Ninth Plenary received the interim report from the Task Force on Planning and Analysis, whose work was extended for one year. The Ninth Plenary also received the reports of the Working Groups, created WGISS, and directed that a process to select Working Group Chairs be prepared. Two publications--the CEOS yearbook and a special report on applications of satellite data--were issued. Collaboration with the IOCCG was set up, and interaction with the SFCG was addressed. An informal meeting on the IGOS led to the ad hoc meeting on the space component of an IGOS in Seattle in 1996.

The minutes of the Ninth Plenary were adopted.

4. MEMBERSHIP ISSUES

Dr. Embleton summarised membership issues that arose late in the year:

The Austrian Space Agency requested CEOS Observer status (document 10.3.1). The Plenary concluded that the ASA does not meet the membership criteria for Observer status as described in the CEOS Terms of Reference and the request was declined.

The ISPRS requested Affiliate status (document 10.3.2). It was noted that ISPRS previously applied for Affiliate status, but because it was considered to be a professional organisation, the request was declined. Also, the Terms of Reference require the Plenary to invite organisations to become Affiliates. It was generally agreed that CEOS may benefit from dialogue with ISPRS and that Affiliate status should be considered in light of ISPRS' scientific activities and the CEOS strategic objective to explore new ways to interact with users.

It was agreed that CEOS may benefit from closer interaction with the ESCAP, which has a unique role among the five United Nations regional commissions. It was noted that ESCAP has a significant program in space technology applications, and it is a CEOS strategic objective to support developing country activities. The Chair/Secretariat is to address this during the next year. (See Section 16.)

A recommendation of the Seattle meeting was to invite the GTOS to become an Affiliate. Consensus was reached, through correspondence prior to this meeting, that GTOS be invited to become an Affiliate.

The Chair sent CEOS background and membership information to Thailand's space agency. The incoming Chair/Secretariat may need to address this during the next year.

As part of the Future CEOS Strategy activities, it was agreed to examine a new category of involvement in CEOS--dialogue partners. (See Section 7.)

Action 10-1: Chair/Secretariat to inform the Austrian Space Agency as to the reason why its request for Observer status was declined.

Action 10-2: Chair/Secretariat to consider opportunities for establishing a dialogue with ISPRS and report to the 11th Plenary.

Action 10-3: Chair/Secretariat to ascertain ESCAP's interest in involvement in CEOS activities, take appropriate action, and report to the 11th Plenary.

Action 10-4: Chair/Secretariat to finalise admission of GTOS as an Affiliate.

5. SECRETARIAT REPORT

Mr. Kingwell, of CSIRO, summarised the Secretariat's activities during 1996 (document 10.4.1). The Secretariat supported numerous activities related to IGOS, the Task Force on Planning and Analysis, revisions to the CEOS Terms of Reference, and clarification of Working Group Chair appointment process (document 10.5.1). ESA provided the CEOS Dossier and database. STA/NASDA provided the

CEOS Newsletters. NASA provided the CEOS Consolidated Report (document 10.4.2) and the CEOS exhibit display. CSIRO provided the report from the Seattle meeting, the revised CEOS Strategy, the CD-ROM in support of developing countries and education, and background papers on the CEOS Strategy, space frequency allocation and interactions with the commercial sector. The Chair and Secretariat also held four CEOS Open Fora. Mr. Kingwell thanked the CEOS colleagues for the opportunity to be involved in the Secretariat activities and for their support throughout the year.

The participants expressed gratitude to Mr. Kingwell for his dedication and contributions to CEOS during 1996. They also expressed thanks to Dr. Hopkins for his long service as the ESA representative to the Secretariat, and welcomed Dr. Harald Arend and Mr Masaki Ichihashi, as the new ESA representative and additional NASDA representative, respectively.

Action 10-5: Members, Observers, and Affiliates are encouraged to inform the Chair/Secretariat of opportunities for CEOS Open Fora, and of potential issues upon which these should focus.

6. WORKING GROUP REPORTS

A. Working Group on Calibration and Validation

Dr. Till, the outgoing WGCV Chair, presented the WGCV progress report (document 10.5.2). The WGCV has 40 members from approximately 27 agencies, and four subgroups. The WGCV started the implementation of the WGCV Dossier on Calibration and Validation, with support from NASA. It contains three sections addressing test sites, laboratories, and instruments. It is available on the World Wide Web at:

<http://spso.gsfc.nasa.gov/calval/reply/form.html>

The participants were invited to review the WGCV Dossier, to ask questions, and to provide input.

The revised WGCV Strategic Plan (document 10.5.3) was issued in September 1996. It includes the WGCV Terms of Reference, and plans and action items for WGCV as a whole and for each of the Subgroups. The WGCV activities and publications are available on the WGCV World Wide Web home page at: <http://www.eos.co.uk/ceos-calval/>

The WGCV also published its Newsletter no. 6 with support from BNSC, welcomed the IOCCG representative, and helped to develop the CEOS Working Group Chair selection process. Also, the space frequency coordination and developing country tasks from the last Plenary are being addressed.

In response to a query from Mr. Morgan, of the GOSSP, Dr. Till confirmed that WGCV welcomes the participation of the Global Observing Systems Space Panel in WGCV activities.

With the initial recommendation 2 modified by the discussion, the Plenary endorsed the following recommendations:

WGCV RECOMMENDATIONS TO THE TENTH CEOS PLENARY

Recommendation 1: Interferometric SAR

Recognising:

The importance of long sequences of data for validation and for understanding of interferometric SAR data, and

The need for a global digital elevation model for effective validation and use of other Earth observation data and the current lack of complete global coverage; and noting:

A number of opportunities for collection of interferometric SAR data, such as:

- an extension of the ERS-1/ERS-2 Tandem Mission,*
- coordination of central frequencies of SAR sensors to make tandem missions possible, and*
- the NASA Spaceborne Radar Terrain Mapper Mission.*

The WGCV recommends that agencies take any available opportunity to collect SAR data for interferometric processing with high coherence, and to plan such missions when possible.

Recommendation 2: Calibration and Test Sites

In view of the increasingly sophisticated needs of the user community for accurate, calibrated satellite data for applications such as weather forecasting, resource assessment, and climate and global change studies, the CEOS WGCV recommends that Earth observation satellite operators continue and augment their commitment to the improvement of satellite data by:

- including reliable onboard calibration systems in new satellite sensors,*
- supporting the establishment of and operation of international surface-based test sites for the post-launch characterisation of sensors,*
- supporting multinational, multisensor, comparison campaigns using these test sites.*

The beneficiaries of these actions will include the members of the World Meteorological Organization, the United Nations Environment Programme, the International Geosphere-Biosphere Programme, the Global Climate Observing System, the Global Ocean Observing System, and many other organisations and programs concerned with the application of Earth observation data.

With respect to Recommendation 1 concerning interferometric SAR data, Members, Observers, and Affiliates were asked to review use of such data, to better support the current and planned SAR missions. The WGCV also was asked to provide feedback on utilisation of interferometric SAR and other data products made available by agencies as a result of WGCV recommendations.

Regarding the WGCV's request for Plenary guidance on the possibility of the WGCV responding to an international AO, it was generally agreed that it would be inappropriate for a CEOS Working Group to respond to an AO, because the Terms of Reference do not provide for such an activity. However, Working Group participants may choose to individually collaborate on various activities, and many Working Group tasks involve cooperative contributions from various organisations (e.g., the WGISS 1km AVHRR project).

The participants thanked Dr. Till for her leadership and dedication during her tenure as WGCV Chair, which enabled the WGCV to find new direction and make significant progress. Dr. Alan Belward, of EC JRC, will become the WGCV Chair following the Tenth Plenary meeting.

Action 10-6: Members, Observers, and Affiliates are encouraged to enhance use of interferometric SAR data, including for validation purposes.

B. Working Group on Information Systems and Services

Ms. Wood, WGISS Chair, presented the WGISS status report (document 10.5.4). She said the Subgroups are doing an incredibly good job and thanked the CEOS organisations for their support and sponsorship, which allowed so much progress to be made. During 1996, WGISS worked to organise itself with a strong user focus and to prepare the WGISS Five-Year Plan (document 10.5.5), which was submitted to the Plenary for consideration. Significant progress also was made by the Subgroups on the numerous tasks in which they are involved.

The WGISS organisation includes a User Panel and three Subgroups (Data, Access, and Networks). WGISS-level tasks also are identified, including a WGISS Strategy Task, to integrate top-down objectives with bottom-up tasks undertaken by the Subgroups and Task Teams, and a Hazards and Emergency-Response Task. Much progress was made to improve and expand the CEOS InfoSys, the IDN, CINTEX (a test bed for interoperable catalogue systems), the 1km AVHRR data set, GLOBE, and interoperability of ocean colour data. Discussion is underway to establish a global aerosols database as well. The WGISS Five-Year Plan also introduces the Network Subgroup's Virtual CEOSnet concept and includes tasks to examine how well data is travelling over the networks.

The Plenary endorsed the following WGISS recommendation:

WGISS RECOMMENDATION RE: FIVE-YEAR PLAN

CEOS commends the progress of WGISS in organising its work during its first year. CEOS approves the WGISS general direction as described in the WGISS Five-Year Plan.

The Plenary also requested WGISS to consider the implications for its work plans of global developments in Geographic Information Systems and spatial data infrastructure, based on the CCRS offer to support a task in this area. The Plenary also requested WGISS to include in its work plans the CEOS/IGBP-DIS High Resolution Satellite Data Pilot Project as a demonstration project (see Section 15).

The participants thanked Ms. Wood and WGISS members for their valuable contributions and hard work on CEOS' behalf during the past year.

C. Other Directions to the Working Groups

The Plenary asked the Working Group Chairs to provide feedback on results of endorsements as part of their annual reports to the Plenary.

It was agreed that it is important for the Working Group Chairs to inform Members, Observers, and Affiliates of the Working Group points of contact. Members, Observers, and Affiliates also were encouraged to identify representatives to participate in the Working Group activities. Observers and Affiliates were reminded that they can fully participate in the Working Groups under the revised CEOS Terms of Reference.

It was noted that the Working Group Chairs will remain informed of developments in CEOS strategic planning and IGOS activities through participation in the Strategic Implementation Team and Secretariat activities (see Section 13). The Working Group Chairs were asked to monitor the possible effects of the IGOS activities on their five-year plans as those activities progress. Also, the WGCV Chair was asked to consider relevant findings from the In Situ Observations of the Global Observing Systems Meeting (see Section 10).

Action 10-7: Members, Observers, and Affiliates are encouraged to identify representatives to participate in the Working Groups, their Subgroups, Panels, and Task Teams. The CEOS Chair will inform Members, Observers and Affiliates of their representatives to the Working groups and remind them that they can participate fully in the CEOS Working groups under the new Terms of Reference.

7. FUTURE CEOS STRATEGY

Dr. Embleton reviewed the revised Future CEOS Strategy (document 10.7.2), which was approved by consensus prior to the Tenth Plenary. He also presented an issues paper on the CEOS Strategy (documents 10.7.3 and 10.7.4), to facilitate discussion and help to distil strategic issues facing CEOS. The issues paper, which was circulated prior to the meeting, suggested Plenary response to the following strategic issues:

- Report of the Task Force on Planning and Analysis;
- maintenance of the CEOS Dossiers and database of missions and requirements;
- regarding IGOS, whether CEOS should remain a "best efforts" organisation primarily focused on coordination of Earth observing satellite programs;

- regarding commercial interactions, whether CEOS should remain essentially a forum for public-funded agencies, and whether such interactions can be improved through a new category of involvement in CEOS activities (e.g., through non-voting dialogue partners);
- whether CEOS needs to engage a greater variety of users to accomplish its objectives, perhaps through the concept of dialogue partners;
- the need to analyse CEOS frequency management requirements;
- whether CEOS outreach activities should continue to be handled by the Chair/Secretariat and how they can be sustained on a "best efforts" basis; and
- whether CEOS needs to examine the process by which it develops its strategic plan.

The Plenary addressed each of these points in its deliberations. It was generally agreed that the Chair/Secretariat should facilitate discussion of current membership categories, the concept of dialogue partners, and the process for CEOS strategic planning and make recommendations to the Plenary as appropriate.

Action 10-8: Chair/Secretariat to consider the appropriateness of current CEOS membership categories and the concept of dialogue partners, take appropriate action, and report to the 11th Plenary.

Action 10-9: Chair/Secretariat to consider methodologies for reviewing the CEOS Future Strategy and report to the 11th Plenary.

8. CEOS INTERACTIONS WITH THE COMMERCIAL SECTOR

Dr. Embleton reviewed the past and current situation regarding CEOS interactions with the commercial sector and provided discussion points on the topic (document 10.6.1). He noted that CEOS Open Fora have been held to address commercial interactions and there is continued interest in CEOS by the private sector. Also, the commercial sector now regularly uses advanced technology and increasingly provides end-to-end services. Many CEOS organisations also have pronounced roles in the commercial sector. He asked the participants to consider whether the CEOS Strategy should reflect activities with private sector bodies; how CEOS would establish a relationship with the private sector, and what would be its purpose; and what role the private sector may have in the IGOS.

It was agreed that interactions with the commercial sector should be considered further, especially in terms of the proposed dialogue partners concept.

Action 10-10: Chair/Secretariat to seek input from Members, Observers, and Affiliates on means of strengthening interactions with the commercial sector, especially in regard to actions 10-8 and 10-9, and report to the 11th Plenary.

9. REPORT ON THE SEATTLE AD HOC MEETING ON THE IGOS SPACE COMPONENT

On behalf of NOAA and NASA, Mr. Winokur described the rationale for an IGOS and the outcomes of the Seattle meeting (document 10.8.3). Because many CEOS

agencies participated in the Seattle meeting, and because the report from the Seattle meeting was circulated prior to the Tenth Plenary meeting (document 10.8.2), the participants generally understood the nature of the IGOS concept and recognised the need to move forward to implement the strategy. The Plenary accepted the following recommendations from the Seattle meeting:

**SEATTLE MEETING: RECOMMENDATIONS FOR ACTION
TO THE CEOS PLENARY**

Recommendation 1: The outcome of the Seattle Ad Hoc CEOS meeting on the Space Component of an IGOS should be discussed at the CEOS Plenary.

Recommendation 2: To address issues concerning development of IGOS, the 1996 Plenary should consider creating a CEOS Study Team, composed of Members, Observers, and Affiliates ready to contribute to an IGOS.

Recommendation 3: The CEOS Chair/Secretariat should undertake a review of the CEOS Terms of Reference with regard to:

- *the status of Affiliates within CEOS*
- *changes necessary to accommodate an IGOS and report to the Plenary*

Recommendation 4: The Global Terrestrial Observing System should be invited to become a CEOS Affiliate; and

Recommendation 5: GCOS should be invited to present, to the 1996 Plenary, results of the September meeting on In Situ Observations for Global Observing Systems.

All of the recommendations were addressed during the Tenth Plenary. (See Section 13 for Plenary decisions on IGOS.)

10. PRESENTATION ON THE GENEVA IN SITU OBSERVATIONS OF THE GLOBAL OBSERVING SYSTEMS MEETING

Dr Williams of EUMETSAT spoke on behalf of GTOS' Prof. Townshend who was unable to be in Canberra. He presented some achievements of the Geneva meeting (document 10.9.1). (The report of the meeting was not available for Plenary review.) The meeting was the first joint meeting of the global observing systems (GCOS, GOOS, and GTOS). Several specific recommendations were made concerning key global data sets that need to be assembled (aircraft observations, aerosols, living marine resources, and hydrological data). It also was recommended that the global observing systems coordinate their CEOS participation through the Global Observing Systems Space Panel (GOSSP), i.e., the GCOS Space Panel expanded to include GOOS and GTOS. (The GCOS Data and Information Management Panel is to expand to include GOOS and GTOS as well.)

Additional recommendations were made concerning calibration, validation, and data management, and principles and activities relating to the collection of long-term consistent observations were identified. However, due to the complexity of the in situ community, no consensus was reached on the integration of all in situ observations. The Geneva meeting participants agreed that efforts should continue to explore the benefits of developing the IGOS.

The recommendations relating to calibration and validation were an important step in developing a strategy for in situ observations. Dr. Belward noted that the WGCV participated in the Geneva meeting. He had identified actions to address the relevant calibration and validation recommendations, but awaits Plenary action on IGOS before presenting them to WGCV members. Existing WGCV activities address some of the recommendations as well.

Dr Mohr recognised the value of the in situ meeting in giving momentum to the subject. Nonetheless he expressed some disappointment at the limited progress made by the meeting itself.

Dr. Hinsman advised that the intergovernmental sponsors of the Global Observing Systems (GCOS, GOOS, GTOS), many of which are CEOS Affiliates, agreed to form a Sponsors' Group and held a preparatory meeting on 15 October 1996 in Geneva, Switzerland. The Sponsors are FAO, ICSU, IOC, UNEP, UNESCO and WMO. The Sponsors' Group agreed that a major priority would be the responsibility for preparing an integrated global observing strategy as an umbrella for the three Observing Systems and other international observation activities. The approaches to space-based and in situ observations needed to be linked across all the Observing Systems, organisation mandates, and the topical and sectoral areas. This topic should be a priority item for the first meeting of the Sponsors' Group to be held 13-14 January 1997. (See Section 13 for Plenary decisions on IGOS.)

11. TASK FORCE ON PLANNING AND ANALYSIS

A. Final Report of the Task Force on Planning and Analysis

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 structure. The final report from the Task Force was circulated prior to the Plenary meeting (document 10.10.1). A database manual, status report on information inputs, and examples of information outputs were also provided (documents 10.10.2 through 10.10.4).

Dr. Bizzarri reported that it is now possible to compare user requirements and instrument performances to see how well requirements are met. The database is to be implemented on CEOS InfoSys, with a full copy of the database resident at each of the coordinating nodes. Information to populate and maintain the database can be entered remotely. Additional work is required to improve the amount and quality of information on space system capabilities and user requirements, and to refine definitions and terminology. Also, maintenance of the database configuration and scientific quality of the information need to be addressed.

It was noted that differences between the CEOS Dossier database and the Affiliates' database need to be resolved so that IGOS-related analytical activities can proceed quickly from a unified database approach providing identical results. The Plenary conditionally endorsed the following recommendations of the Task Force on Planning and Analysis, pending completion of database work and resolution of differences between the CEOS Dossier database and the Affiliates' database:

**CONCLUSIONS AND RECOMMENDATIONS FROM THE
TASK FORCE ON PLANNING AND ANALYSIS**

- i) To approve the release of the CEOS Database for general use, noting that its different parts will be available at different times after approval by the individual information providers, and that its contents will be subject to refinements for still some time.*
- ii) To invite CEOS participants to take note of the Definitions and Guidances reported in the Database Manual, to comply with them on an interim basis until a new version and the up-dating modalities are formally approved by CEOS, and to provide contributions for their consolidation.*
- iii) To invite CEOS participants, both service providers and users, urgently to revise and complete their input to the Database in compliance with the Definitions and Guidance chapters of the Database Manual, preferably using electronic means; and thereafter, to periodically review their input and up-date it as needed.*
- iv) To arrange for the maintenance of the Database, which implies both configuration control and monitoring of the scientific content of the information; specific care to be placed in the next consolidation phase.*

Dr. Emiliani confirmed that ESA will support maintenance of the Dossier database as described in recommendation (iv) above. A meeting is planned for January 1997 to devise a plan to resolve differences in the two databases. The Chair/Secretariat agreed to monitor the situation with respect to recommendations (i) through (iv) to ascertain when resolution is complete.

The Plenary thanked Dr. Bizzarri and members of the Task Force on Planning and Analysis for their hard work, which brought significant progress to the CEOS requirements analysis effort.

Action 10-11: Chair/Secretariat to work with ESA, former Task Force on Planning and Analysis members, and others to devise, by January 1997, an implementation plan to speedily resolve outstanding differences between the CEOS and Affiliates' databases.

B. CEOS Dossier Database

Mr. Fusco, of ESA, reported the status of the Dossier database (document 10.10.5). He noted that population of the database is not yet complete and full functionality is not yet available. However, all functions needed to conduct requirements analyses are implemented and the database design can accommodate changes and extensions that may be required. An important next step will be to make the database operational on the IDN.

C. GCOS Requirements Analysis Demonstration

Mr. Morgan, head of the GOSSP, described a comparative analysis of Affiliate requirements and missions of Members (documents 10.10.6 through 10.10.8). The analysis was conducted with EUMETSAT support and endorsed by WMO. The Affiliates' database (also called the "WMO database") was the primary direct source of information on both the user requirements and the system capabilities. This data base had been populated with information supplied both by CEOS Members and CEOS Affiliates. The information was supplemented by some references where necessary to printed CEOS information, especially the 1995 Yearbook.

Mr. Morgan recommended that the analysis be completed over the next year by a joint team composed of representatives from GOSSP, user groups, and CEOS Members. It was agreed that the general analytical approach was acceptable. However, it was noted that the example analysis focused on operational system requirements and would need to be expanded to accommodate research and other requirements. It was also clarified that all the Affiliates' requirements were to be represented in the analysis effort, not just those of the global observing systems.

It was agreed that the analysis activity would be very useful in furthering the work begun by the Task Force on Planning and Analysis and the IGOS activities undertaken by CEOS. (See Section 13 for Plenary decisions on IGOS.)

12. CEOS NETWORK DEMONSTRATION

Mr. Kingwell introduced the network demonstration, the primary purpose of which was to show how on-line networks and distributed processing can benefit users of Earth observation information (document 10.11.1). Additional objectives included making Earth observation data more useful and to improve its management, to promote cooperation in Earth observation in the Asia-Pacific region, and to demonstrate some achievements of the WGISS.

Dr. Lilleyman, of CSIRO's Division of Information Technology, presented a demonstration of Earth observation data exchange over networks (documents 10.11.2 and 10.11.3). The demonstration included access and processing of data to produce high-speed delivery of processed data products (image warping of a satellite image to a standard map projection, progressive image transfer, and three-dimensional terrain fly-through).

Mr. Ishida, of NASDA, presented a demonstration of the use of international links to transmit moving-window images in real-time from the ADEOS (now the "Midori") satellite to the Plenary meeting (document 10.11.4). On several occasions during

the meeting, participants were able to view quick-look images from the AVNIR instrument during Midori overpasses of Russia and China.

During the Plenary, interactive demonstrations also were conducted that enabled participants selectively to access international catalogues and process data located at NASDA, the Chinese Remote Sensing Ground Station, the Indian National Remote Sensing Agency, and the Australian BoM.

The Plenary applauded the technical teams for their efforts and thanked them for their hard work and dedication.

13. IGOS: NEXT STEPS IN CEOS

Dr. Williams reviewed the discussion paper, circulated prior to the meeting, that proposed CEOS' next steps related to the IGOS (document 10.12.1). The paper proposed that the Plenary consider establishing a study team to develop an overall strategy for implementing the space component of the IGOS along the lines set out in the discussion paper. A requirements/measurements analysis group also was proposed to be set up jointly with the GOSSP. Dr. Williams also suggested specifics, such as scope, membership, and schedule, for the Analysis Group and study team to carry forward CEOS activities related to the IGOS for the next year (document 10.12.2).

After deliberation, the Plenary accepted the recommendations in the background paper and presentation, noting that it is important for the Affiliates to participate in the IGOS activities. It was 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.

It was agreed that 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 is important to consider aspects of existing programs and missions that could be identified to realise early progress toward the IGOS.

The Plenary directed that two activities be pursued, with progress reports to be made at the next Plenary meeting.

First, a Strategic Implementation Team was set up to 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 participants should be 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 realise the IGOS. The team will prepare recommendations to the Plenary as to how the space component of an IGOS could be implemented. The team will rely, in part, on the output of the IGOS Analysis Group.

Dr. Embleton, of CSIRO, agreed to serve as Chair of the Strategic Implementation Team. Dr. Mohr of EUMETSAT, Dr. Emiliani of ESA, Mr. Paillon of EC, Mr. Seipel of DARA, Mr. Townsend of NASA, Mr. Winokur of NOAA, and Mr. Okuma of STA volunteered to participate in the strategic implementation team. Mr. Jayaraman of ISRO and Prof. Xu of NRSCC will try to confirm participation. The Plenary asked the WGCV and WGISS Chairs to participate. A representative of the IGFA offered to consult as well (document 10.12.3), and the Chair/Secretariat will consider this and take appropriate action.

The Plenary accepted NASA/NOAA's offer to host the first meeting of the Strategic Implementation Team in the Long Beach, California, USA area on 6-7 February 1997. This would follow an AMS session on 5 February 1997 on integrating user needs with provider plans: it was expected that many participants of the SIT will also attend.

Second, an Analysis Group was set up 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; results of the analysis are to be provided to the Strategic Implementation Team. The Analysis Group is open to all Members, Observers, and Affiliates, but should include participants with the skills, time, and resources required to contribute to the analysis.

It was recognised that the methodology for the analysis should build on the analysis demonstration presented by Mr Morgan and be refined as appropriate. It also was recognised that the differences between the CEOS Dossier database and the Affiliates' database need to be resolved before the Analysis Group can proceed.

Mr. Haruyama, of STANASDA, agreed to serve as Chair of the Analysis Group. The Affiliates confirmed that Mr. Morgan, of GOSSP, will serve as the Affiliates' point of contact for the group.

Action 10-12: Chair/Secretariat to consider a closer relationship with IGFA and its offer to support the CEOS IGOS study; take appropriate action; and report to the 11th Plenary.

Action 10-13: Members, Observers, and Affiliates are asked to nominate appropriate representatives to the Analysis Group and the Strategic Implementation Team, and inform the Chairs of those groups and the CEOS Chair/Secretariat of the named representatives, by 15 December 1996.

Action 10-14: Chairs of the Analysis Group and the Strategic Implementation Team to work with the Chair/Secretariat to develop Terms of Reference; assure early progress of work; and report to the 11th Plenary.

Action 10-15: NASA/NOAA to host the first meeting of the Strategic Implementation Team tentatively planned for 6-7 February 1997 in the Long Beach, California, USA area.

14. SPACE FREQUENCY ALLOCATION PANEL DISCUSSION

Dr. Embleton reviewed a background paper on frequency allocation in Earth observation which was circulated prior to the meeting (document 10.14.1). The background paper proposed that CEOS consider collective interaction with the SFCG, by nominating a CEOS representative to that group. A list of SFCG contacts also was distributed prior to the meeting (document 10.14.5).

Prof. Price, of CSIRO, facilitated a panel discussion of issues of interest to CEOS in international radio frequency allocation and management. Mr. Jacobsen, of the Tidbinbilla Tracking Station, provided an introductory overview of the SFCG. Dr. Hinsman described the WMO perspective on space frequency management (document 10.14.4). Dr. Maeda, the NASDA space frequency coordination representative, described the need for protecting against radio frequency interference (document 10.14.2), and provided the text of the SFCG's Resolution 12-1R4, Requirements of Space Agencies for Consideration at Future World Radio Conferences (document 10.14.2-1). Mr. Luther, of NASA, presented NASA's perspective on frequency management and identified some key issues that could be pursued for the WRC-97, held by the ITU (document 10.14.3).

It was agreed that CEOS needs to be more active in protecting Earth observation-related radio frequencies. To accomplish this, the Chair/Secretariat was asked to facilitate a closer relationship with the SFCG, perhaps through the proposed dialogue partner category of involvement in CEOS. It was agreed to set up within CEOS an informal group of experts on space frequency management to advise on these matters; the Chair/Secretariat was asked to facilitate this activity. In addition, Members, Observers, and Affiliates were asked to work with their national or organisational contacts in preparing for WRC-97.

Action 10-16: Chair/Secretariat to take appropriate action on maintaining a dialogue with the SFCG.

Action 10-17: Members, Observers, and Affiliates to nominate suitable experts as members of an ad hoc coordination group on spectrum management; Chair/Secretariat to take appropriate action.

Action 10-18: Members are encouraged to urge their national administrations to consider, and make appropriate proposals, to WRC-97 and future ITU conferences, in order to protect the required frequencies for Earth observation from interference by other services, and to promote the primary allocation of radio spectrum considering SFCG resolution 12-1R4. Observers, Affiliates and others are also encouraged to support these activities.

15. CEOS/IGBP-DIS PILOT PROJECT ON HIGH RESOLUTION SATELLITE DATA

Dr. Szejwach, of IGBP-DIS, reported on the background and status of the high resolution satellite data project (documents 10.15.1 and 10.15.2). He explained that the initial objective of the pilot project--to test the CEOS satellite data exchange principles in support of global change research--was successfully achieved. Several data sets have been provided and the project has progressed to a focus on developing a global metadata system to support the Core Projects. He presented a

recommendation to continue the project as a demonstration project to be handled within the WGISS.

The Plenary endorsed the following recommendation regarding this project:

**RESOLUTION ON THE CEOS/IGBP-DIS
HIGH RESOLUTION SATELLITE DATA PILOT PROJECT**

Taking note of the excellent progress and scientific results achieved in the frame of the joint CEOS/IGBP-DIS High Resolution Satellite Data Pilot Project, CEOS:

- i) supports the continuation of this activity in the form of a Demonstration Project;*
- ii) encourages space agencies to continue their implementation of the CEOS Data Policy Resolution in support of Global Change Research through provision of high resolution data to IGBP projects;*
- iii) invites the IGBP-DIS Office to coordinate the IGBP data requests to the relevant participating space agencies;*
- iv) directs WGISS to include this activity in its Five-Year Plan.*

Dr. Williams, of CSIRO, presented scientific results of the savanna ecology and management study along the IGBP North Australian Tropical Transect (document 10.15.3).

16. ASIA-PACIFIC REGIONAL SPACE APPLICATIONS FOR SUSTAINABLE DEVELOPMENT

Dr. He described ESCAP's comprehensive program to implement the Regional Space Applications Program for Sustainable Development in Asia and the Pacific, which was launched as a result of the 1994 Beijing Declaration on Space Applications for Environmentally Sound and Sustainable Development in Asia (document 10.17.1). STA/NASDA, NRSSC and other CEOS agencies are planning related projects with ESCAP. One area of common interest was information networks for exchange of Earth observation products and data. The Chair/Secretariat is to explore closer ties with ESCAP in the coming year (see Section 4).

17. DEVELOPING COUNTRY ACTIVITIES

A. CILS

Dr. Liebig, of DARA, presented the status of the CILS, which is a pilot project that aims to engage developing country users in the Earth observation information technology environment and provide them with Earth observation data and information (document 10.18.1). The CILS project is now being coordinated through the WGISS: DLR, CSIRO, EU, ESA, UNEP and others are taking part in the pilot

project. STA/NASDA expressed interest in supporting this initiative to help provide developing country users with CILS capabilities. The EC also plans developing country-related projects through the Center for Earth Observations and the IOC expressed interest in reaching off-line developing country users, possibly through CD-ROM.

Action 10-19: DARA to give a final report on the CILS pilot phase to the 11th Plenary.

B. CSIRO CD-ROM

Mr. Kingwell reviewed the background of and described the CD-ROM, "Resources in Earth Observation: case studies, data and information for schools and developing countries" (document 10.18.2). The CD-ROM was released and the task is completed. CSIRO will assess feedback on the initial release and consider future releases. STA/NASDA offered to provide the CD-ROM in Japanese and there may be requirements to provide it in other languages. CEOS participants were encouraged to contact Mr. Kingwell if they are able to support continuation of this activity.

C. Proposal for Annual CEOS Report on Developing Countries

Mr. Lafeuille, of EUMETSAT, proposed that CEOS participants provide inputs for an annual report to the Plenary on CEOS developing country activities (document 10.18.4). It was agreed that this was an excellent way to enhance information sharing on developing country activities among CEOS organisations.

Action 10-20: EUMETSAT to seek input from Members, Observers, and Affiliates to prepare an annual report to the Plenary on CEOS developing country activities.

18. REPORT FROM THE IOCCG

Mr. Withrow summarised the activities of the IOCCG (document 10.19.1). The IOCCG's near-term work plan aims to: 1) ensure that all ocean colour sensors receive maximum support during sensor reviews; 2) develop a plan for a continuous, long-term time series of ocean colour data, including intercalibration and validation; 3) conduct training and activities to expand use of ocean colour data and products; and 4) consolidate ocean colour data requirements. An ocean colour calibration/validation workshop was held and work is progressing in that area. In addition, the United Nations International Year of the Oceans is 1998, and this will provide a unique opportunity to increase awareness of the usefulness of ocean colour data.

19. CEOS TERMS OF REFERENCE

Mr. Kingwell reported on activities to revise the CEOS Terms of Reference, which were undertaken in response to a recommendation from the Seattle meeting on the space component of the IGOS that CEOS address the status of Affiliates and any changes to accommodate the IGOS (documents 10.20.1 through 10.20.3). The Terms of Reference were revised to: 1) reflect that Observers and Affiliates can participate fully in the Working Groups and ad hoc groups; 2) clarify that "exclusion" is not the only possible outcome of a review of the change in status of an

organisation; and 3) require Observers and Affiliates to designate points of contact. The revised Terms of Reference were adopted by consensus through correspondence on 10 October 1996. Further review of the Terms of Reference may be necessary as IGOS develops.

20. SIGNIFICANT EVENTS OF MEMBERS, OBSERVERS, AND AFFILIATES

The following organisations provided verbal reports on status of programs; attachments are indicated for those that provided written reports, as well:

- ASI (document 10.21.1)
- STA/NASDA (documents 10.21.2 and 10.21.9)
- INPE (documents 10.21.3 and 10.21.4)
- DARA (document 10.21.5)

DARA showed first results from the German MOMS stereo camera located on board the Russian MIR space station and from the multispectral scanner MOS on the Indian satellite IRS-P3.

- ISRO (document 10.21.6)
- NASA (document 10.21.10)

- CNES: Mr. Brachet noted the main program events for CNES in the last year were the launch of the CNES instruments aboard ADEOS and the decision to proceed with the TOPEX-Poseidon Follow-On Mission (now called "Jason").

- UNEP: Mr. Henricksen advised that a special UN session is planned for June 1997 dealing with the five years of progress since the UNCED Conference in Rio de Janeiro. He suggested that this may provide a significant opportunity for CEOS to promote awareness of its activities.

The following organisations provided written status reports in lieu of verbal reports:

- ESA (document 10.21.8)
- NRSCC (document 10.21.7)

21. REPORTS FROM RELATED MEETINGS

A. WIPO

Dr. McEwan, of CSIRO, called attention to a diplomatic conference to be convened by the WIPO on 2-20 December 1996 in Geneva. The conference is to address the proposed Treaty on Intellectual Property in Respect of Databases, which would define the exclusive proprietary rights in a database to be in the possession of the maker of the database. This was recognised to be of concern to scientific users who rely on open access to data, and it was agreed that CEOS organisations need to keep apprised of developments in this area and share information with one another as appropriate.

Action 10-21: Members, Observers, and Affiliates are encouraged to share relevant information regarding developments in respect of WIPO consideration of database copyright.

B. CGMS

Mr. Lafeuille provided a written report on the outcome of the CGMS-XXIV meeting (document 10.16.2).

C. SAF

Mr. Lafeuille provided the SAF Statement on the Objective of Spreading the Benefit of Mission to Planet Earth towards Development Countries, which was adopted by SAF-4 in Beijing on 9 October 1996 (document 10.16.3). The SAF recommendations are taken into account in the CEOS developing country activities. (See Section 17.)

D. SAR Working Group

ESA provided a summary report of the activities of the ad hoc international SAR Working Group (document 10.16.1).

22. PLENARY ACTION ITEMS

Mr. Kingwell confirmed that all action items from the Ninth Plenary were completed prior to or during this meeting. Action items 9-11 regarding the SFCG, 9-16 regarding CEOS Open Fora, and 9-17 regarding interactions with the commercial sector are closed and revised by new actions from the Tenth Plenary. Dr. Embleton reviewed a preliminary list of actions from the Tenth Plenary; a final list reflecting the Plenary's confirmation will be circulated with the meeting minutes.

23. PLANNING FOR FUTURE CEOS MEETINGS

Mr. Brachet confirmed that CNES, the 1997 CEOS Chair, will host the 11th CEOS Plenary on 19-21 November 1997 in Toulouse, France. He advised that, in his view, CEOS priorities in 1997 will be IGOS activities, SFCG activities, and the UN environmental conference. He introduced Mr. Gerard Begni, of CNES, who will assist him in handling CEOS Chair activities during the year.

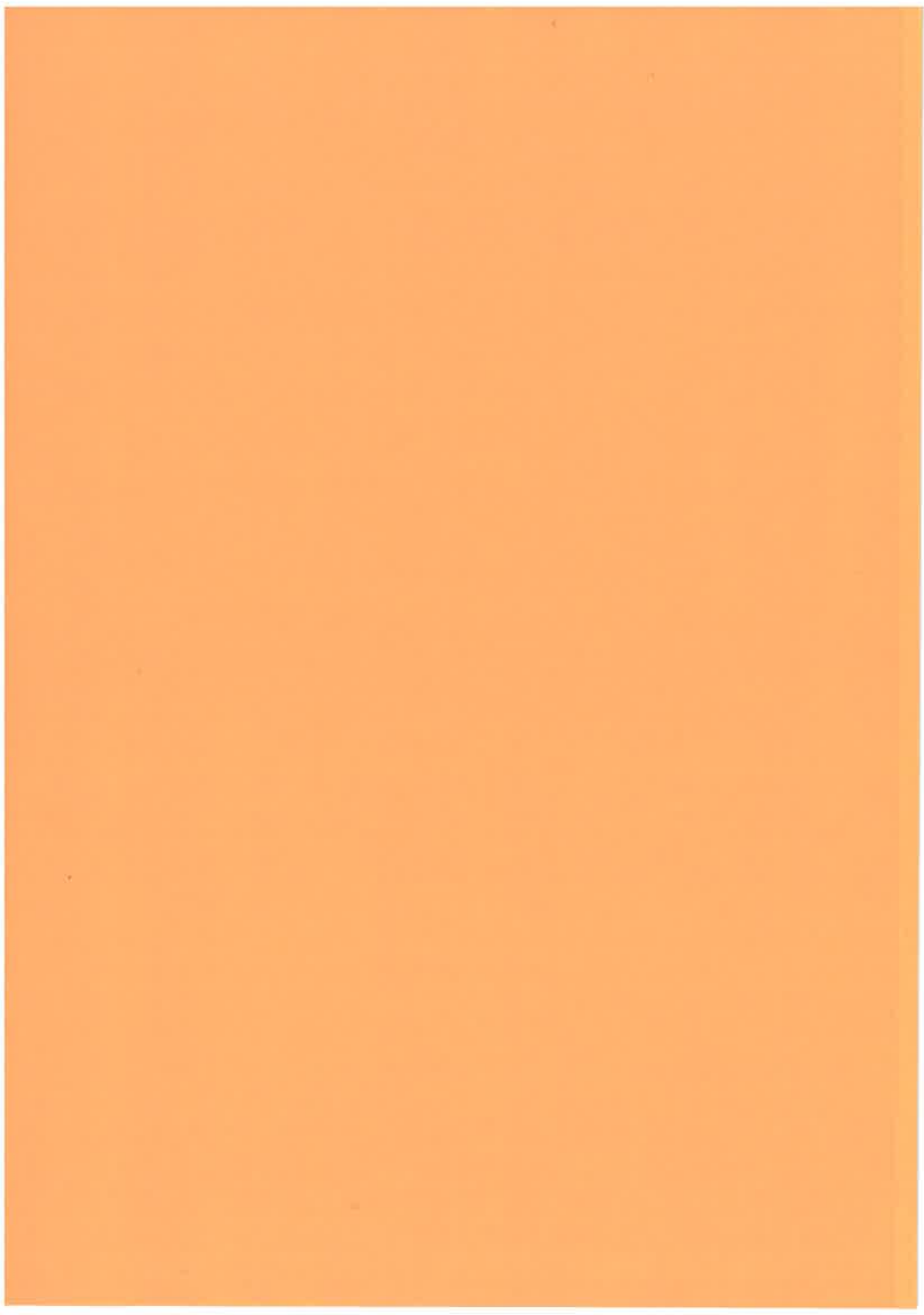
Mr. Jayaraman confirmed that ISRO, the 1998 CEOS Chair, will host the 12th CEOS Plenary in Bangalore, India (dates to be determined).

The Plenary accepted the nomination of EUMETSAT as the 1999 CEOS Chair, pending confirmation by EUMETSAT.

24. ADJOURNMENT

Dr. McIntosh, the CSIRO Chief Executive, closed the meeting, noting that CSIRO recognises the significant role of CEOS in Earth observation and the increasing importance of international collaboration and cooperation. He launched the CD-ROM for schools and developing countries, with thanks to CEOS organisations who contributed to the effort to make Earth observation data more accessible.

The participants thanked Dr. Embleton, Mr. Kingwell, and the CSIRO staff for their valuable contributions to CEOS, which enabled a very productive year for CEOS.



ORGANISATIONS ATTENDING THE TENTH CEOS PLENARY

MEMBERS:

- Agenzia Spaziale Italiana (ASI)
- British National Space Centre (BNSC)
- Canadian Space Agency (CSA)
- Centre National d'Etudes Spatiales (CNES)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Deutsche Agentur für Raumfahrtangelegenheiten (DARA)
- European Commission (EC)
- European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)
- European Space Agency (ESA)
- Indian Space Research Organisation (ISRO)
- Instituto Nacional de Pesquisas Espaciais (INPE)
- National Aeronautics and Space Administration (NASA)
- National Oceanic and Atmospheric Administration (NOAA)
- National Remote Sensing Center of China (NRSCC)
- Russian Federal Service for Hydrometeorology and Environment Monitoring (ROSHYDROMET)
- Science and Technology Agency of Japan (STA)
- Swedish National Space Board (SNSB)

OBSERVERS:

- Canada Centre for Remote Sensing (CCRS)
- Crown Research Institute (CRI)

AFFILIATES:

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

AUSTRALIAN DELEGATION:

- Australian Center for Remote Sensing (ACRES)
- Australian Center for Test and Evaluation (ACTE)
- Bureau of Meteorology (BoM)
- Department of Defence (DoD)

BRITISH DELEGATION:

- United Kingdom Department of Environment (DoE)

CANADIAN DELEGATION:

- Atmospheric Environment Service (AES) of Environment Canada

CHINESE DELEGATION:

- Chinese Academy of Science (CAS)
- Commission of Science, Technology and Industry for National Defense (CSTIND)
- Chinese Embassy

JAPANESE DELEGATION:

- Japan Meteorological Agency (JMA)
- Geological Survey of Japan (GSJ)
- Ministry of International Trade and Industry (MITI)
- National Space Development Agency of Japan (NASDA)

RUSSIAN DELEGATION:

- Russian Embassy

SWEDISH DELEGATION:

- Swedish Space Corporation (SSC)

GUESTS OF THE CEOS CHAIR:

- Economic and Social Commission for Asia and Pacific (ESCAP)
- International Group of Funding Agencies (IGFA)

ACTION ITEMS

Action 10-1: Chair/Secretariat to inform the Austrian Space Agency as to the reason why its request for Observer status was declined.

Action 10-2: Chair/Secretariat to consider opportunities for establishing a dialogue with ISPRS and report to the 11th Plenary.

Action 10-3: Chair/Secretariat to ascertain ESCAP's interest in involvement in CEOS activities, take appropriate action, and report to the 11th Plenary.

Action 10-4: Chair/Secretariat to finalise admission of GTOS as an Affiliate.

Action 10-5: Members, Observers, and Affiliates are encouraged to inform the Chair/Secretariat of opportunities for CEOS Open Fora, and of potential issues upon which these should focus.

Action 10-6: Members, Observers, and Affiliates are encouraged to enhance use of interferometric SAR data, including for validation purposes.

Action 10-7: Members, Observers, and Affiliates are encouraged to identify representatives to participate in the Working Groups, their Subgroups, Panels, and Task Teams. The CEOS Chair will inform Members, Observers and Affiliates of their representatives to the Working groups and remind them that they can participate fully in the CEOS Working groups under the new Terms of Reference.

Action 10-8: Chair/Secretariat to consider the appropriateness of current CEOS membership categories and the concept of dialogue partners, take appropriate action, and report to the 11th Plenary.

Action 10-9: Chair/Secretariat to consider methodologies for reviewing the CEOS Future Strategy and report to the 11th Plenary.

Action 10-10: Chair/Secretariat to seek input from Members, Observers, and Affiliates on means of strengthening interactions with the commercial sector, especially in regard to actions 10-8 and 10-9, and report to the 11th Plenary.

Action 10-11: Chair/Secretariat to work with ESA, former Task Force on Planning and Analysis members, and others to devise, by January 1997, an implementation plan to speedily resolve outstanding differences between the CEOS and Affiliates' databases.

Action 10-12: Chair/Secretariat to consider a closer relationship with IGFA and its offer to support the CEOS IGOS study; take appropriate action; and report to the 11th Plenary.

Action 10-13: Members, Observers, and Affiliates are asked to nominate appropriate representatives to the Analysis Group and the Strategic Implementation Team, and inform the Chairs of those groups and the CEOS Chair/Secretariat of the named representatives, by 15 December 1996.

Action 10-14: Chairs of the Analysis Group and the Strategic Implementation Team to work with the Chair/Secretariat to develop Terms of Reference; assure early progress of work; and report to the 11th Plenary.

Action 10-15: NASA/NOAA to host the first meeting of the Strategic Implementation Team tentatively planned for 6-7 February 1997 in the Long Beach, California, USA area.

Action 10-16: Chair/Secretariat to take appropriate action on maintaining a dialogue with the SFCG.

Action 10-17: Members, Observers, and Affiliates to nominate suitable experts as members of an ad hoc coordination group on spectrum management; Chair/Secretariat to take appropriate action.

Action 10-18: Members are encouraged to urge their national administrations to consider, and make appropriate proposals, to WRC-97 and future ITU conferences, in order to protect the required frequencies for Earth observation from interference by other services, and to promote the primary allocation of radio spectrum considering SFCG resolution 12-1R4. Observers, Affiliates and others are also encouraged to support these activities.

Action 10-19: DARA to give a final report on the CILS pilot phase to the 11th Plenary.

Action 10-20: EUMETSAT to seek input from Members, Observers, and Affiliates to prepare an annual report to the Plenary on CEOS developing country activities.

Action 10-21: Members, Observers, and Affiliates are encouraged to share relevant information regarding developments in respect of WIPO consideration of database copyright.

Appendix 3

PLENARY DOCUMENTS

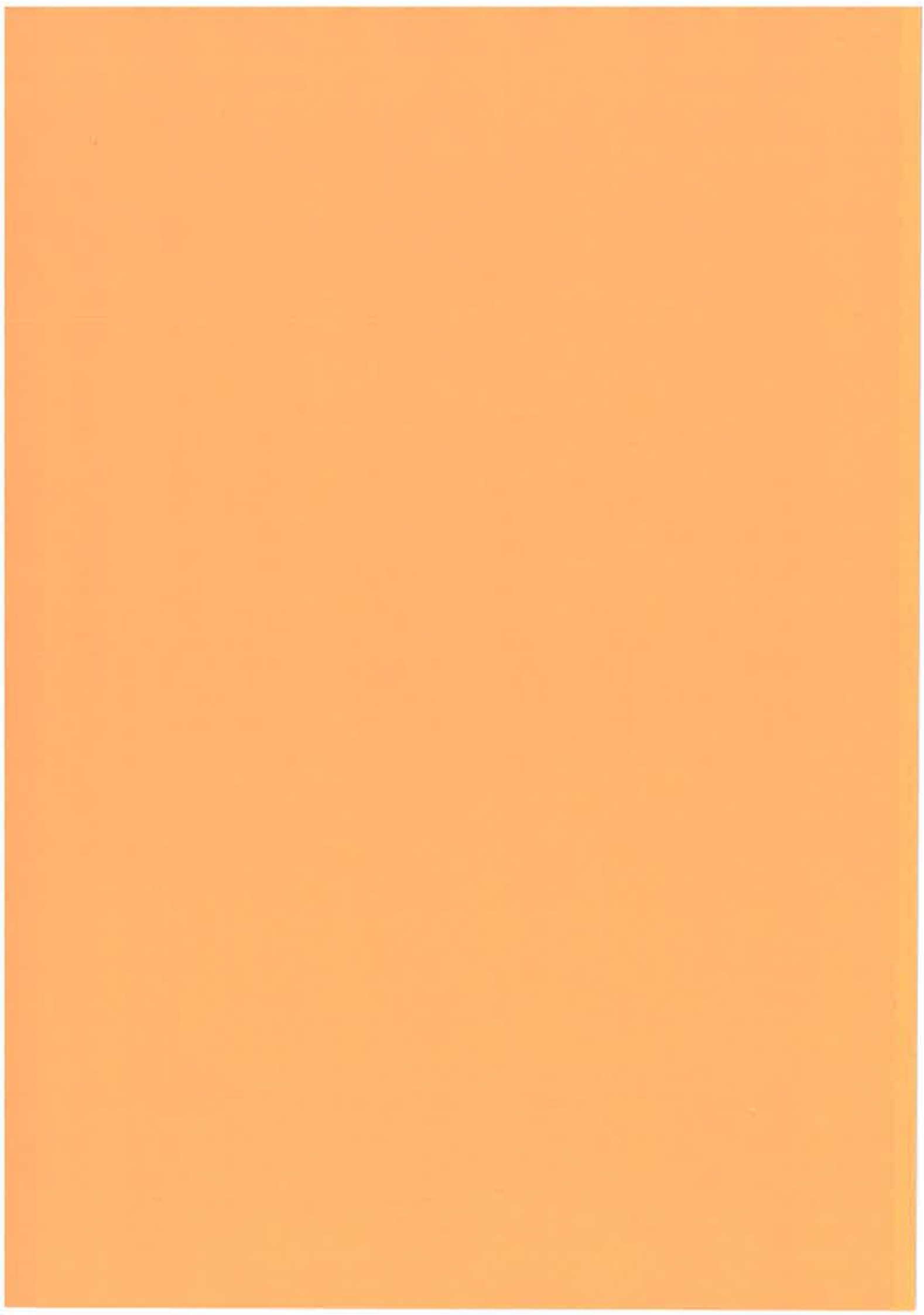
- 10.1.1 Agenda
- 10.3.1 Letter dated 23 October 1996 from J. Ortner/Austrian Space Agency to B. Embleton/CSIRO-CEOS Chair re observer status
- 10.3.2 Letter dated 29 October 1996 from J. Trinder/ISPRS to B. Embleton/CSIRO-CEOS Chair re relationship with CEOS
- 10.4.1 CEOS Secretariat Report, Activities since the 9th Plenary
- 10.4.2 1996 Consolidated Report
- 10.5.1 Selection of CEOS Working Group Chairs
- 10.5.2 Report of the WGCV
- 10.5.3 WGCV Strategic Plan, September 1996
- 10.5.4 Report of the WGISS
- 10.5.5 WGISS Five Year Plan, version 1.0, November 1996
- 10.6.1 CEOS Interactions with the Commercial Sector
- 10.6.2 Interactions with the commercial sector - presentation
- 10.7.1 Future CEOS Strategy,
- 10.7.2 Future CEOS Strategy, Baseline 2, 29 September 1996
- 10.7.3 CEOS Strategy: Issues Paper
- 10.7.4 CEOS Strategy, Report to CEOS 10th Plenary
- 10.8.1 Introductory remarks on IGOS ad-hoc meeting
- 10.8.2 Report of the ad hoc CEOS Meeting on the Space Component of an Integrated Global Observing Strategy, Seattle, Washington, USA, 27-29 March 1996
- 10.8.3 Presentation on Outcomes of the ad hoc CEOS Meeting on the Space Component of an Integrated Global Observing Strategy
- 10.9.1 In Situ Observations for the Global Observing Systems, Development of an integrated strategy and identification of priorities for implementation, Report of the meeting held on 10-13 September 1996, Geneva, Switzerland
- 10.10.1 Final Report of the Task Force on Planning and Analysis
- 10.10.2 Manual of the CEOS Database on User Requirements and Space Capabilities
- 10.10.3 Database on User Requirements and Space Capabilities, Status of Information on Affiliates' Requirements as at end-1996
- 10.10.4 Database on User Requirements and Space Capabilities, Examples of Information Sheets on Space Programs and Observing Capabilities
- 10.10.5 CEOS Dossiers: readiness for online access
- 10.10.6 CEOS Requirements and Resources: A preliminary comparison of the requirements of the CEOS Affiliates with the missions of CEOS Members, Volume 1-The Report, Volume 2- Executive Summary, Volume 3-The Data Sheets, 9 October 1996
- 10.10.7 CEOS data base files (on disk)
- 10.10.8 Presentation on the Analysis of satellite missions, CEOS Requirements and Resources, A preliminary comparison of CEOS Affiliate requirements with the Missions of CEOS Members
- 10.11.1 CEOS Network Demonstration, A pilot project for sharing and processing Earth observation data in the Asia Pacific region
- 10.11.2 Data Network Demonstration at CEOS Plenary Meeting

- 10.11.3 High Performance Computing and Network Demonstration
- 10.11.4 NASADA ADEOS Demonstration Presentation
- 10.12.1 Next Steps for CEOS in IGOS, Discussion Paper Prepared for the 10th Plenary by the Seattle and Geneva Organizing Committees
- 10.12.2 Presentation on Analysis Group and Vision Group/Study Team
- 10.12.3 Letter dated 12 November 1996 from H. de Boois/IGFA to B. Embleton/CSIRO-CEOS Chair re participation in IGOS study team
- 10.14.1 Frequency allocation in Earth observation: some issues
- 10.14.2 Protection of Earth Observation System from Interference
- 10.14.2-1 SFCG Resolution 12-1R4, Requirements of Space Agencies for Coordination at Future World Radio Conferences
- 10.14.3 Frequency Allocation Panel Discussion, NASA Perspective
- 10.14.4 10th CEOS Plenary Frequency Panel Discussion, WMO Perspective
- 10.14.5 SFCG Members and Observers
- 10.15.1 CEOS/IGBP-DIS High Resolution Satellite Data Pilot Project, Report to the CEOS Plenary Meeting
- 10.15.2 CEOS/IGBP-DIS Pilot Project on High Resolution Data, Presentation to CEOS Plenary 1996
- 10.15.3 Remote sensing and savanna ecology and management: Applications along the IGBP North Australian Tropical Transect (NATT)
- 10.16.1 Summary Report of Activities of the Ad Hoc International SAR Working Group
- 10.16.2 Outcome of CGMS-XXIV, 22-26 April 1996, Lauenen, Switzerland
- 10.16.3 Statement of the Space Agency Forum on the objective of spreading the benefit of Mission to Planet Earth towards developing countries
- 10.17.1 ESCAP's Role in Promoting Regional Cooperation in Space Applications for Sustainable Development in Asia and the Pacific
- 10.18.1 CEOS Information Locator Service, Report to CEOS Plenary
- 10.18.2 CSIRO CD-ROM Presentation
- 10.18.3 CSIRO CD-ROM, Resources in Earth Observation: case studies, data and information for schools and developing countries
- 10.18.4 Proposal to Exchange and Up-Date Information on CEOS Participants Activities in Favor of Developing Countries
- 10.19.1 First Session of the International Ocean Colour Coordination Group (IOCCG), Toulouse, France, 22-23 March 1996
- 10.20.1 CEOS Terms of Reference, Presentation to 10th Plenary
- 10.20.2 CEOS Terms of Reference, adopted 10 October 1996
- 10.20.3 CEOS Terms of Reference, proposed revision 2, 2 September 1996
- 10.21.1 Skymed/Cosmo, Constellation of satellites for the Mediterranean basin observation
- 10.21.2 ADEOS and Its First Images
- 10.21.3 A Brazilian Satellite to Observe and Monitor the Amazon Region, Technical Report
- 10.21.4 SSR, A Brazilian Satellite to Observe and Monitor the Equatorial Region, Presentation
- 10.21.5 Report of the German Space Agency (DARA) to 10th CEOS Plenary Meeting
- 10.21.6 Earth Observation Programme in India
- 10.21.7 Recent Earth Observation Satellite Programs in China
- 10.21.8 Report on the ESA Earth Observation Programs to CEOS Plenary 1996
- 10.21.9 NASDA Earth Observation Satellite Programs
- 10.21.10 NASA's Mission to Planet Earth: Status Update
- 10.22.1 9th CEOS Plenary Action List

ACRONYMS

ACRES	Australian Center for Remote Sensing
ACTE	Australian Center for Test and Evaluation
ADEOS	Advanced Earth Observing Satellite ("Midori")
AES	Atmospheric Environment Service of Environment Canada
AMS	American Meteorological Society
AO	Announcement of Opportunity
ASI	Agenzia Spaziale Italiana
AVHRR	Advanced Very High Resolution Radiometer
AVNIR	Advanced Visible and Near-Infrared Radiometer
BNSC	British National Space Centre
BoM	Bureau of Meteorology (Australia)
CAS	Chinese Academy of Science
CCRS	Canada Centre for Remote Sensing
CD-ROM	Compact Disc-Read Only Memory
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CILS	CEOS Information Locator Service
CINTEX	CEOS Interoperability Experiment
CNES	Centre National d'Etudes Spatiales
CRI	Crown Research Institute (New Zealand)
CSA	Canadian Space Agency
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSTIND	Commission of Science, Technology and Industry for National Defense
DARA	Deutsche Agentur für Raumfahrtangelegenheiten
DoD	Department of Defence (Australia)
DoE	United Kingdom Department of Environment
EC	European Commission
ERS	European Remote Sensing Satellite
ESA	European Space Agency
ESCAP	Economic and Social Commission for Asia and Pacific
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
GCOS	Global Climate Observing System
GLOBE	Global Land One-kilometer Base Elevation
GOOS	Global Ocean Observing System
GOSSP	Global Observing Systems Space Panel
GSJ	Geological Survey of Japan
GTOS	Global Terrestrial Observing System
ICSU	International Council of Scientific Unions
IDN	International Directory Network
IGBP	International Geosphere-Biosphere Programme
IGBP-DIS	IGBP Data and Information System
IGFA	International Group of Funding Agencies
IGOS	Integrated Global Observing Strategy
INPE	Instituto Nacional de Pesquisas Espaciais
IOC	Intergovernmental Oceanographic Commission
IOCCG	International Ocean Colour Coordination Group

InfoSys	CEOS Information System
ISPRS	International Society for Photogrammetry and Remote Sensing
ISRO	Indian Space Research Organisation
ITU	International Telecommunications Union
JMA	Japan Meteorological Agency
JRC	EC Joint Research Center
JSTC	GCOS Joint Scientific and Technical Committee
MITI	Ministry of International Trade and Industry (Japan)
NASA	National Aeronautics and Space Administration (USA)
NASDA	National Space Development Agency of Japan
NOAA	National Oceanic and Atmospheric Administration (USA)
NRSCC	National Remote Sensing Center of China
ROSHYDROMET	Russian Federal Service for Hydrometeorology and Environment Monitoring
SAF	Space Agency Forum
SAR	Synthetic Aperture Radar
SFCG	Space Frequency Coordination Group
SNSB	Swedish National Space Board
SSC	Swedish Space Corporation
STA	Science and Technology Agency of Japan
TOPEX	Ocean Topography Experiment
UN	United Nations
UNCED	UN Conference on Environment and Development
UNEP	UN Environment Programme
WCRP	World Climate Research Programme
WGCV	CEOS Working Group on Calibration and Validation
WGISS	CEOS Working Group on Information Systems and Services
WIPO	World Intellectual Property Organisation
WMO	World Meteorological Organization
WRC	World Radio Conference



10th PLENARY DELEGATES

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HIGHLIGHTS OF THE 10TH CEOS PLENARY MEETING NOVEMBER 13-15, 1996; CANBERRA, AUSTRALIA

The 10th Plenary of the Committee on Earth Observation Satellites (CEOS) was hosted by the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) and chaired by Dr. Brian Embleton, Head of the CSIRO Office of Space Science and Applications. Dr. John Zillman, Head of the Australian Bureau of Meteorology and current WMO President, provided opening remarks. Representing NOAA were Robert S. Winokur, Assistant Administrator for Satellite and Information Services (and CEOS Principal); Helen M. Wood, Director of Satellite Data Processing and Distribution (and Chair, CEOS Working Group on Information Systems and Services); and D. Brent Smith, NESDIS International and Interagency Affairs Chief (and CEOS Point of Contact). The NASA delegation was headed by William F. Townsend, Acting Associate Administrator, Mission to Planet Earth. Highlights of the 10th CEOS Plenary are as follows:

- o The Plenary endorsed the concept of an Integrated Global Observing Strategy (IGOS) and accepted recommendations from the March 1996 ad hoc CEOS Meeting on the Space Component of an IGOS, hosted by NOAA and NASA. Specifically, the Plenary endorsed the creation of a Strategic Implementation Team (SIT) to develop an overall strategy for the stepwise implementation of the IGOS space component. The study team will comprise senior (CEOS Principal) level members who can act with authority to define, characterize and develop a vision for IGOS. Outgoing CEOS Chair Brian Embleton was selected by Plenary members to head the SIT. The Plenary accepted the proposal of NASA and NOAA, that the SIT hold its first meeting, February 6 (and 7), 1997, off site from the American Meteorological Society meeting that will be held that week in Long Beach, California. Senior CEOS agency officials intending to participate include Bob Winokur, Bill Townsend, EUMETSAT Director Tillmann Mohr, European Space Agency (ESA) Earth Observation Director Lanfranco Emiliani, as well as senior officials from the Japanese Science and Technology Agency (STA), the Japanese Space Agency (NASDA), the French Space Agency (CNES), the German Space Agency (DARA), and the Global Climate Observing System (GCOS).
- o Also created as a critical element of IGOS was an Analysis Group to be comprised of programmatic and technical expertise from CEOS member and observer agencies and CEOS Affiliate user organizations with a proposed specific linkage to the Space Panel of the Global Observing Systems (formerly the GCOS Space Panel). The Analysis Group will take the existing set of requirements that was identified through the now-completed two year work of the CEOS Task Force on Planning and Analysis and analyze the extent to which the data products from existing and planned satellites meet these needs. Identified national requirements will also be reviewed. This analysis will identify overlaps and gaps and should also identify opportunities where multi-instrument data sets could be used to generate new products. Selected to chair the Analysis Group was Yukio Haruyama of NASDA. Haruyama has outlined an aggressive work schedule for the group beginning with a kick-off meeting in March 1997. The incoming CEOS Chair will contact the GxOS Space Panel and its sponsoring organizations to invite participation with CEOS in the Analysis Group.

- o While the IGOS SIT and Joint Analysis Group have been set up under the aegis of CEOS, the Plenary looks forward to CEOS agency participation with the Global Observing Systems and other organizations involved in *in situ* activities in coordination of IGOS. The Chair of the International Group of Funding Agencies for Global Change Research (IGFA) directed a letter to CEOS proposing IGFA collaboration with respect to IGOS.
- o A key prerequisite to the commencement of Joint Analysis Group activities is the reconciliation of two differing data bases maintained by ESA and WMO deriving from the work of the Task Force on Planning and Analysis. In assessing the final report of this task force, the Plenary directed the incoming CEOS Chair to work with ESA, the WMO, and former task force members to devise, by January 1997, an implementation plan to resolve outstanding differences between the ESA and WMO data bases.
- o The Plenary commended the CEOS Working Group on Information Systems and Services (WGISS) and its chair, Helen Wood, on progress in organizing its work during its first year. It approved the WGISS general direction as described in the WGISS Five Year Plan. It requested that WGISS consider expanding its work plans to also address global developments in GIS and spatial data infrastructure.
- o Outgoing Working Group on Calibration/Validation (WGCV) Chair Susan Till was replaced at the Plenary by Alan Belward of the European Communities' Joint Research Centre. WGCV was encouraged by the Plenary to address appropriate calibration/validation recommendations emanating from the September 1996 Meeting on *In Situ* Observations for the Global Observing Systems held in Geneva, Switzerland.
- o CEOS Terms of Reference were modified by the Plenary to authorize broader participation by CEOS Affiliates and Observers, particularly Working Group activities.
- o The Plenary focused on the issue of protecting required frequencies for Earth observation in the deliberations of the upcoming 1997 World Radiocommunication Conference, encouraging interaction with the Space Frequency Coordination Group as well as CEOS members' efforts to work with their national administrations in protecting their interests. The Plenary also addressed the issue of upcoming World Intellectual Property Organization (WIPO) negotiations on "database protection."
- o Status reports were provided, with Plenary endorsement of work to continue on the CEOS-IGBP High Resolution Data Project, the International Ocean Color Coordination Group and the CEOS Information Locator Service. CSIRO presented copies of a CD-ROM entitled "Resources in Earth Observation," which includes case studies, data and information (contributed by NOAA and other CEOS agencies) for use in schools and developing countries. The Plenary accepted a EUMETSAT offer to compile an annual report on CEOS agency activities with developing countries.
- o Gerard Brachet of CNES succeeded Embleton as CEOS Chair. Next year's Plenary will be held in Toulouse, France from November 19-21.