



CONTENTS

Report from the 20th CEOS Plenary	1
Results from IGOS P-13 bis Meeting	2
Letter from SIT Chair to CEOS Principals	3
The Group on Earth Observations (GEO) and CEOS cooperation: A major step forward	4
Working Group on Calibration and Validation (WGCV)	5
Working Group on Information Systems and Services (WGISS)	6
Working Group on Education, Training and Capacity Building (WGEdu)	7
CEOS New Member: TUBITAK UZAY	7
Message from the CEOS Chair / Meeting Calendar	8

Report from the 20th CEOS Plenary

Dr. Conrado F. Varotto, CONAE (Argentina), CEOS Chairman

On November 14 and 15, CEOS Members and Associates met for the 20th Plenary meeting of the Committee, which was held in the city of Buenos Aires, Argentina, hosted by Comision Nacional de Actividades Espaciales (CONAE). The main focus of the discussions was to continue the elaboration of a strategy for the future of CEOS, in the light of the conclusions of the Task Force Report adopted by the 19th Plenary in London, in 2005.

The meeting was opened by Mr. Jorge Taiana, Minister of Foreign Affairs and Chair of the Board of CONAE, who addressed participants highlighting the importance the Government gives to Earth observation in Argentina and encouraging the work of CEOS Members and Associates in creating cooperation bonds in the field of space.

2006 has been a year of transition, in which the Committee has been seeking a way to strengthen its structure and position itself as the space arm of the Group of Earth Observations (GEO) and its Global Earth Observation System of Systems (GEOSS). This entails a redefinition of the current organization and structure of CEOS. As part of such changes, the Plenary agreed on the creation of a new, full-time, position (later agreed to be called "Executive Officer") reporting to the CEOS Chair, and with the mandate of ensuring the efficient conduct of the CEOS contribution to GEO - including the implementation of the response to the GCOS IP, the GEO Work Plans, and development of the Constellations.

During 2006, the stronger role of the SIT Chair and his team was reflected in an intensive work to start the elaboration of proposals that will lead the work of the Committee. In particular, the CEOS



Minister and CEOS Chairman at the Opening Ceremony

Implementation Plan for GEOSS is to be highlighted. This includes the concept of the CEOS constellations, and a summary of the prototypes being developed was presented. Strong support from CEOS Agencies will be needed if this is to succeed. SIT also has worked to ensure that there is a coordinated response to the GEO Work Plan by CEOS Agencies.

US Geological Survey (USGS) has led the
 (to be continued on page 2)



Participants of the 20th CEOS Plenary



Results from IGOS-P13bis Meeting

Dr. Conrado F. Varotto, CONAE (Argentina), *Outgoing IGOS-P Chairman*

IGOS-P 13 bis meeting took place on November 13th, 2006 in Buenos Aires, Argentina. The meeting was Co-Chaired by Keith Alverson (IOC/UNESCO) and Conrado Varotto (CONAE).

At the meeting, upon a proposal from CEOS/SIT, the Partners agreed to review the Partnership status and think over the future functioning of IGOS-P in the light of the Global Earth Observation System of Systems (GEOSS).

So far, IGOS Themes have been collaborating with GEOSS, providing the necessary background and experience to start work in the 9 Societal Benefit Areas, and Partners agree on the great importance to the relationship with GEO and GEOSec, especially in the implementation phase of the IGOS Themes.

It is recognized that, although most Themes have been very successful in capturing the needs of users and providing a strong scientific background, they still lack the phase of implementation. In this sense, GEO may permit IGOS to maximize capacities and find new sources of support.

GEO/GEOSS is quickly establishing itself, and IGOS has contributed to the GEO Work Plans for 2006 and 2007/9, by participating and even leading some of the tasks identified in the Work Plans. However, IGOS Themes still have to analyze and find a suitable path of evolution that allows them to transition into a strong and clear relationship with GEO.

Therefore, IGOS has decided to commission a small team, including Themes, Partners and GEOSec, to prepare a proposal for this transitioning period and present it for discussion at IGOS-P 14 that will take place on May 30 in Paris.

With respect to the Themes, several of them made an update presentation. The Cryosphere Theme is ready for review by the Partners, and will be submitted with sufficient time to IGOS-P14 in May for its approval, as well as the Land Theme, and a Geodetic Theme proposal, prepared by the Global Geodetic Observation System (GGOS). ■

(continued from page 1)

preparation of a coordinated response by CEOS Agencies to the Global Climate Observing System (GCOS) Implementation Plan, which was presented at the 12th Conference of the Parties (COP-12) of the UN Framework Convention on Climate Change (UNFCCC) in Nairobi, Kenya, the week before the CEOS Plenary. The good reply from Members and Associates will have to be kept in the future to carry out the actions recommended by the CEOS response.

Edoardo Marelli made a presentation of the recommendations of the Space Frequency Coordination Group (SFCG) for the agenda of the World Radiocommunications Conference 2007 (WRC 07), regarding the protection of frequencies used for Earth Observation. The Plenary approved a

resolution adopting the SFCG recommendations, and agencies were encouraged to work with their national delegations to



Chair hand over

WRC07 in order to protect space frequencies essential to the activities of Earth observation from space.

British National Space Centre (BNSC) presented the results of a survey of the use of space frequencies by CEOS prepared during 2006, which will be updated annually. All Agencies were encouraged to send their inputs. It was agreed that space frequency Issues will be included as a standing item in the agenda of the CEOS Plenary.

At the end of the meeting, Conrado Varotto thanked Members and Associates for their continuing support and handed the chairmanship over to Barbara Ryan, from USGS, who announced the next Plenary will be held in Hawaii, in November 2007. ■



20th CEOS Plenary in Buenos Aires

Letter from SIT Chair to CEOS Principals

Dr. Volker Liebig, ESA/ESRIN (Italy), SIT Chairman

Dear colleagues,

2006 has been a busy year for those of us active in space agency co-operation efforts under the CEOS umbrella. In 2005, space agencies reaffirmed CEOS as the forum for managing their co-ordination efforts and resolved to find a new focus, guided by the GEOSS requirements and documented in a new CEOS

Implementation Plan (for space-based observations for the GEOSS). Having sought and won the recognition from the broader GEO community for the role of main coordination body for the GEOSS space segment, we must now deliver - and demonstrate that we are able to organise ourselves and achieve results that actually contribute to the societal benefits envisaged by GEOSS.

2006 has been a year of building foundations. We have:

- identified a new process, the CEOS Constellations, to inspire and manage more focused coordination efforts, moving CEOS away from the general to the specific;
- developed an outline for the proposed Implementation Plan document;
- established effective processes and relationships for responding to the Work Plans emerging from GEO in order to define precisely the role for CEOS;
- gone some way down the road on the Climate dimension of our efforts - taking the opportunity of being invited to respond to the GCOS Implementation Plan to the UNFCCC COP-12, resulting in 59 actions which will form the basis for the Climate Chapter of our own CEOS Implementation Plan.

I should note with appreciation the huge effort in 2006 of the IP Task Force established to help share the load of these significant works, particularly



ESA/ESRIN in Frascati

in developing the CEOS response to the GCOS Implementation plan. The importance of this document was recognised by the Conference of the Parties to UNFCCC in Nairobi in November 2007. But impressive as our outputs have been in 2006, they are still to date only reports. If space agencies are to retain recognition and influence within the GEO and broader political communities, we must now in 2007 and beyond convert the planning into specific implementation results that demonstrate a resolve amongst countries to compromise and adapt their programme planning for the sake of the common good on pressing issues of global concern - such as climate change. Whether this resolve exists is yet to be demonstrated and this demonstration will mark a major milestone in the maturity of this CEOS community. It is my hope that - with support and active participation of senior staff from the relevant agencies - the CEOS Constellations studies can identify specific inter-agency agreements to be achieved in 2007 ahead of the GEO Summit. Building confidence that we can achieve co-ordination results and demonstrating the benefits will, I hope, precipitate renewed enthusiasm amongst governments and space agencies to contribute to the CEOS cause. ESA hopes to lead the way by exploring the actions required to ensure our next generation of Earth observing missions are fully compliant with the GCOS Climate Monitoring Principles.

Finally, I am pleased to announce that the next SIT meeting will be hosted by ESA on 19-20 June 2007 at our ESRIN establishment in Frascati (Italy). ■



The Group on Earth Observations (GEO) and CEOS cooperation: A major step forward

Drs. Michael Rast, Giovanni Rum, Osamu Ochiai and José Achache, GEO Secretariat (Switzerland)

At the 20th CEOS Plenary in Buenos Aires, CEOS-chair, Conrado Varotto, emphasised the important link between CEOS and GEO and referred to CEOS as the “Space Branch of GEO”.

This exemplary cooperation has been and will continue to develop along several lines. First of all, the development of the Virtual Constellations concept will be a key contribution to the implementation of GEOSS and, as such, one of the important elements of the cooperation of GEO and CEOS in the future. The initiation of the four proposed “Pilot Studies”, i.e. (i) sea level height including large rivers and lakes, (ii) precipitation, (iii) land imaging and (iv) atmospheric chemistry, will be the first corner stone, demonstrating the contribution of different observing systems to virtual constellations. The value of these virtual constellations for GEO stems from their cross-cutting nature, an essential feature of Global Earth Observation System of Systems (GEOSS). It is, therefore, important that each of the virtual constellations continues to be developed with the goal to serve several societal benefit areas.

The contribution of CEOS to GEO is also developing through the CEOS Working Groups. The Working Group on Information Systems and Services has had a strong involvement in the GEO Architecture and Data Management activities. It has been instrumental in building the GEO architecture, in particular the interoperability of systems and their information, as well as the GEO Clearinghouse through which data and information will be accessible for the user. The development of the GEO Web Portal is also considered a vital element here.

In parallel, the Working Group on Calibration and Validation has taken up the challenge of establishing a set of criteria and best practices which forms the basis for a global Calibration/Validation web portal. The first steps of this effort have already been laid down in a White Paper and it will ensure that information and data available through GEOSS will be “quality assured.” GEO would like to commend the work of the outgoing chair of this group, Dr Stephen Ungar from NASA GSFC, who was recognised by the CEOS Plenary for the advances the group has made over the last years. “Through WGISS, information has become accessible. Through WGCV, it will be usable”, he said.

Essential contributions to the capacity building activities of GEO are being made by the Working



Group on Education, Training and Capacity Building (WGEdu), through the organization of capacity building workshops and training activities related to GEO tasks. An even closer cooperation between WGEdu activities and the GEO Capacity Building Committee are envisaged for the future.

Keeping the balance between the nine Societal Benefit Areas of GEOSS is one of the prime guiding principles of the GEO Secretariat, in order to preserve the essential cross-cutting nature of GEO. This is achieved by engaging with all the Communities involved in Earth observation, and through ensuring harmonised progress of the GEOSS main elements and transverse activities of GEO: Architecture and Data Management, Capacity Building, Science and Technology and User Interface. The GEO Secretariat is also keen to ensure the appropriate combination of space observations and in-situ observing systems, allowing the implementation of a Global Earth Observation System of Systems in which information from both space and in situ systems will be serving one or more SBAs. In this respect, the development of the sensor web approach for in situ networks is likely to facilitate, in the near future, the integration of data from virtual constellation with in situ data.

The positive cooperation developing between CEOS and GEO, as highlighted at the CEOS Plenary meeting in Buenos Aires, was an important input to the GEO-III Plenary which took place in Bonn, Germany just two weeks later. It was perceived as an indication of GEO's progress in streamlining contributions to GEOSS all over the planet and across all the communities involved. ■

Working Group on Calibration and Validation (WGCV)

Dr. Stephen G. Ungar, NASA/GSFC (USA), WGCV Former Chair

Dr. Petya K. E. Campbell, JCET/UMBC (USA), WGCV Secretariat

WGCV held its 26th Plenary meeting in conjunction with the 17th Infrared and Visible Optical Sensors (IVOS) meeting, in Chiang Mai, Thailand from October 30 to November 3, 2006. Dr. Chanchai Peanvijarnpong, Deputy Director of Geo-Informatics and Space Technology Development Agency (GISTDA), Bangkok, Thailand welcomed the WGCV26 participants. WGCV highly commends our host Pakorn Aphaphant, GISTDA for the efficient organization in facilitating this very productive and enjoyable venue.

During WGCV26 the group elected a new WGCV Chair and Vice Chair; reviewed the achievements of the WGCV subgroups and member agencies; addressed the WGCV participation in GEO tasks; and generated WGCV Action Items and Recommendations to the CEOS 20th plenary. The 27th WGCV Plenary will be held 12th-15th of June, 2007 and hosted by Nigel Fox, National Physical Laboratory, in Teddington, UK.

The WGCV Chair, Stephen Ungar, NASA GSFC completed a three-year term. During this period WGCV conducted five plenary meetings, actively contributed to the work of CEOS and established its participation in GEOSS. A WGCV strategy for cal/val of global satellite data and a white paper on 'Data Quality Guidelines for Satellite Sensor Observations Relevant to GEOSS *Calibration and Validation Issues*' were produced (<http://wgcv.ceos.org/>). Currently, WGCV is leading/co-leading two GEO Tasks and contributing expertise to 14 others. WGCV thanks Dr. Ungar for his significant contributions to the work and leadership of the group.

During 2006-2008 Changyong Cao, NOAA will chair WGCV, while Pascal Lecomte, ESA will serve as vice chair and in 2008-2010 will succeed the WGCV

Chairman.

The WGCV Atmospheric Chemistry Subgroup (ACSG) Chair Ernest Hilsenrath, NASA GSFC has stepped down. WGCV commends highly Dr. Hilsenrath for his outstanding work and contributions to WGCV and ACSG. ACSG will now be chaired by Bojan Bojkov NASA/GSFC, while Jean-Christopher Lambert IASB/BIRA will serve as vice-chair.

The following four WGCV recommendations, accepted at the 21st CEOS Plenary, will enable WGCV to contribute significantly to CEOS and GEOSS: (1) Request that all CEOS members ensure that all future missions include a quality assurance component, stating the accuracy of the data and all derived products; (2) CEOS requests that member space agencies coordinate efforts with existing cal/val archives and that member agencies supply the necessary resources to implement the requirement to establish uniform data protocols for collecting, archiving, and accessing validation data across Earth science disciplines; (3) CEOS requests that their *operational* member agencies (e.g. WMO, NOAA, EUMETSAT, USGS, etc.) devise a comprehensive cal/val plan that meets the needs of the *extended* (e.g. research) user community; (4) CEOS requests that all member agencies: (a) provide support to perform additional ground measurements for direct validation, taking advantage of already existing networks; (b) prepare subsets of data/products for global land product inter-comparisons, as described by CEOS/WGCV/LPV; (c) support the actual processing of these data sets and the dissemination of the corresponding validation results. ■



The Participants of the WGCV-26 in Chiang Mai, Thailand



Working Group on Information Systems and Services (WGISS)

Mr. Ivan Petiteville, ESA/ESRIN (Italy), WGISS Chair

WGISS held its 22nd meeting in conjunction with its two Sub-Groups, Technology & Services and Projects & Applications in the charming city of Annapolis, MD, USA, 11-15 September 2006. About 50 representatives attended the combined Working Group and Sub-Group sessions. Our host, Kathy Fontaine (NASA) and her highly dedicated colleagues provided an excellent venue. In addition a non-host dinner in a famous crab-house gave us the opportunity to appreciate the local delicacy, the Chesapeake Bay crab, and to get acquainted with the tricky use of the wooden hammer.

WGISS-22 was the second WG meeting since the initiation of the 'CEOS Implementation Plan for Space-based Observations for the GEOSS'. The WGISS contribution to GEO was discussed at length, specific tasks in the 2006 GEO Work Plan were identified as potential areas of WGISS contribution, and WGISS Points of Contact (POCs) were assigned to reach out to the GEO Tasks POCs for these tasks. It includes the support to the GCOS-related activities. The presence of a GEO Secretariat representative was very fruitful to the detailed definition of the working group's contribution. The potential WGISS contributions to GEO were identified as:

International Directory Network (IDN), Interoperable Catalogus System, WGISS Test Facility (WTF) concepts (i.e. WTF-Coordinated Enhanced Observing Period (CEOP) and WTF-Disasters) and emerging technologies like GRID and Service Oriented Architectures. Potential WGISS contributions to the 2007-2009 GEO Work Plan were presented and discussed, including the support to the Virtual Constellation Concept. The identified WGISS potential contributions will be finalized soon following the recent endorsement of the GEO 2007-2009 plan at the GEO III Plenary (Nov. 2006).

The WGISS 5-Year plan update proposal was discussed in detail. The main reason for changing it was the increasing support from WGISS to the CEOS Implementation Plan. The updated plan has been approved at the last CEOS Plenary (Nov. 2006)

Liaison reports were presented involving International Council of Scientific Unions (ICSU), ICSU Committee on Data (CODATA), Consultative Committee for Space Data Systems (CCSDS), World Data Center (WDC), Electronic Geophysical Year (eGY), Global Spatial Data Infrastructure Association (GSDI), and CEOS Working Group on Education, Training and Capacity

Building (WGEdu). These liaisons allow WGISS to interact with and to better understand activities affecting Earth observation areas of interest.

The WGISS-22 Host Workshop discussed NASA's concepts for moving its Earth Sciences data systems into the future, outlining a measurement-based data processing system, data discovery and access initiatives, and the background of several community-focused working groups and their efforts to date.

During the WGISS Plenary, new positions and activities were discussed. Points of Contact were identified for each of the GEO WP tasks where WGISS has been cited as contributing.

WGISS-23 will be hosted by the Vietnam Remote Sensing Center (VNRSC) (Hanoi, 21-25 May 2007) and sponsored by JAXA. ■



WGISS-22 Participants.

Working Group on Education, Training and Capacity Building (WGEdu)

Ms. Yolanda Berenguer, UNESCO (France), WGEdu Chair

The Working Group on Education, Training, and Capacity Building (WGEdu) conducted a workshop on 16-17 November 2006 in Buenos Aires, immediately after the

20th CEOS Plenary, entitled "Earth Remote Sensing for Secondary School Educators". The workshop was aimed at raising awareness of secondary school science teachers and education ministry officials in Latin American countries of the importance of space technology and their applications and at preparing teachers to introduce the science, technology and applications of Earth remote sensing in

their classrooms. More than 70 secondary school educators and representatives of the Ministry of Education of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador and Uruguay participated in the workshop. The Comisión Nacional de Actividades Espaciales (CONAE), Chair of the 20th CEOS Plenary, hosted the workshop and gave generous financial contribution, as well as USGS, ESA and NOAA. In-kind contributions were provided by EUMETSAT, INPE, UNESCO and UN-OOSA.



CEOS New Member: TUBITAK UZAY

Dr. Erol Tunali, *Space Technologies Research Institute, The Scientific and Technological Research Council of Turkey*

TUBITAK UZAY (“Uzay” means “Space” in Turkish) was founded in 1984 to conduct studies on electronic system research and development, having the name “Ankara Electronics R&D Institute.” In 1995 the name changed to better reflect the studies conducted in the institute, as “Information Technologies and Electronics Research Institute”. In 1998, Satellite Technologies Group has been initiated and studies have been started on satellite technologies. Since then, the institute has increased the ratio of satellite and space related research and on 6th May, 2006 the name was changed to “Space Technologies Research Institute”. Currently 120 researchers, 31 technical and 38 administrative staff are being employed at the institute.

In 2001, with an agreement between SSTL and TUBITAK UZAY, “BiLSAT Remote Sensing Microsatellite Project” has been started in order to transfer technology in satellite technologies area. Within the context of the project, TUBITAK UZAY staff has acquired training and all necessary facilities to develop small satellites have been installed. BiLSAT has been launched on 27 September 2003. In order to maximize benefits acquired in the framework of this project, two payloads, a real time image compression

board (GEZGiN) and an 8-band multispectral imager have been designed, manufactured and tested in Turkey, mainly by TUBITAK UZAY staff. These payloads, after obtaining successful test results at TUBITAK-UZAY premises, integrated to BiLSAT at the facilities of SSTL. In orbit, GEZGiN and COBAN worked successfully.

After completion of BiLSAT project, TUBITAK UZAY initiated “RASAT Remote Sensing Satellite Project” which aims at building the first domestic Earth observation microsatellite of Turkey. Currently, the preliminary design review has been completed and planned launch date is mid 2008. With RASAT, Turkey will have another Earth observation satellite with a much better spatial resolution.

TUBITAK UZAY also conducts research in signal processing, remote sensing and geographic information systems. The institute has research groups working on various other



areas ranging from power electronics to telecommunication systems.

As a conclusion, TUBITAK UZAY is an institute, conducting research on peaceful uses of space, satellite technologies and remote sensing, promoting researchers and end users to use satellite data and developing instrumentation for Earth observation. TUBITAK UZAY is willing to participate in international projects regarding peaceful uses of space and for the benefit of participants and humankind.

Detailed information can be obtained via:
info@uzay.tubitak.gov.tr or
<http://www.uzay.tubitak.gov.tr> ■

(continued from page 6)

The workshop was opened by Dr. Conrado Varotto, Director of CONAE, and Ms. Barbara Ryan (U.S. Geological Survey), 2007 CEOS Chair. Representatives of the Argentinian National Assembly and the Ministry of Education gave inspirational talks on the benefits and value of space technology to society and the importance of this technology in the science curricula. Lecture topics ranged from the historical overview of satellites in space, remote sensing concepts, data analysis and interpretation to the applications of space technology in agriculture, land use/land cover change, geology, weather & climate, natural disasters and risk management. Invited experts from the Integrated Global Water Cycle Observation (IGWCO) made presentations on water applications. During the hands-on

sessions, the participants were introduced to software packages and educational learning modules developed by ESA, CONAE & INPE. Some of these materials are already available on the WGEdu Education Portal.

The workshop was organized by the WGEdu in memory of Jay W. Feuquay, former U.S. Geological Survey (USGS) Land Remote Sensing Program Coordinator, who passed away in June 2006. Jay Feuquay was a strong supporter of and participant in CEOS, and was a champion of remote sensing education and capacity building.

The WGEdu is committed to conduct workshops for different audiences in the framework of its Five-Year Strategic Plan

(2006-2010). The Plan, initiated during the WGEdu-7 annual meeting in April 2006 in Vienna, is aimed at highlighting the education charter of CEOS and giving visibility to the activities implemented by CEOS member organizations in the fields of education and capacity building. The WGEdu workshops will also be part of CEOS's contribution to the capacity building component of the Global Earth Observation System of Systems (GEOSS) process.

The 8th annual meeting of the WGEdu will be held from 30 April to 2 May 2007 in ESA/ESRIN, Italy. The theme and target audience of the next workshop will be defined at this meeting, as well as the composition of the next WGEdu Executive Committee. ■

Message from the CEOS Chair

Ms. Barbara J. Ryan,
2007 CEOS Chair, USGS (USA)



I would like to express my warmest wishes to you, your colleagues, and your families as we begin this New Year for the Committee on Earth Observation Satellites (CEOS). This year holds much promise for us, and for our efforts to better understand and predict the major environmental changes occurring here on Earth.

Today, national and international decision-makers are grappling with major issues of climate variability and climate change. They are seeking to improve their ability to predict and respond to natural disasters. They are more concerned than ever before about the state of energy, water, and natural resources, and the environment's impact on societal health and well-being.

The intergovernmental Group on Earth Observations (GEO) has been organized to address these and other issues, and to help decision-makers make more effective use of

Earth observation data. CEOS members have been called upon to provide the space-based systems component for GEO, and to work with GEO and other partners to provide decision-makers with timely, accurate, and comprehensive environmental observations.

This work will be both a challenge and an opportunity for CEOS. It will challenge us all to work creatively and collaboratively with one another and with our user community, to address data gaps and to provide a long-term, sustainable data record. Yet it is also a tremendous opportunity for us to deliver timely, accurate, and comprehensive data which will ultimately be used to sustain, safeguard, and enhance life on Earth.

In order to seize this opportunity, CEOS will need the energetic commitment of its members to strengthen our relations with GEO, to

support the CEOS Constellation efforts, and to better coordinate data sharing and applications. It is incumbent upon us all to work together, in a spirit of cooperation, creativity, and perseverance, to bring the benefits of Earth observation data to more people around the world.

This cannot be achieved solely at a plenary or a working group meeting, but through dedicated, day-to-day interactions with our partners near and far. I am very thankful for the many good volunteers who carry out the work of CEOS on a daily basis. And I am grateful for the groundwork laid for 2007 by our Argentinean colleagues, and for the leadership role our South African colleagues will be exercising in 2008.

And so, with a spirit of gratitude and excitement, I look forward to working with you and your colleagues in the coming year! ■

Contributions for future issues of the CEOS Newsletter from the CEOS Members and Associates, and subscriptions to the CEOS Newsletter, please contact CEOS Japan Secretariat : misawa@restec.or.jp <http://www.ceos.org/pages/pub.html#newsletter>

Meeting Calendar

As of February 2007

Activities	2006		2007											
	November	December	January	February	March	April	May	June	July	August	September	October	November	December
CEOS Plenary	▲ 14-15 20th CEOS Plenary CONAE/Buenos Aires													▲ 13-14 21th CEOS Plenary USGS/Hawaii
CEOS SIT (Strategic Implementation Team)									▲ 19-20 SIT-20 ESA/ESRIN Frascati, Italy					
CEOS WGISS (Working Group on Information Systems & Services)								▲ 21-25 WGISS-23 VNRSC&JAXA/ Hanoi, Vietnam					▲ 15-19 WGISS-24 DLR Oberpfaffenhofen, Germany	
CEOS WGCV (Working Group on Calibration and Validation)								▲ 12-15 WGCV-27 NPL/Teddington, UK					▲ 2-4 GEO-CEOS Workshop on Quality Assurance GEO/Geneva	
CEOS WGEdu (Working Group on Education, Training, and Capacity Building)							▲ 4/30-5/2 WGEdu-8 ESA/ESRIN, Frascati							△ 2nd WGEdu Workshop
IGOS Partners (Integrated Global Observing Systems)	▲ 13 IGOS-Pbis CONAE/ Buenos Aires		▲ 9-10 Asia Water Cycle Workshop JAXA/Univ. of Tokyo, Japan		▲ 12-17 CEOP/IGWCO Washington D.C.			▲ 27-29 Water Quality Workshop ESA	▲ 30 IGOS-P14 Paris					
Others	▲ 28-29 GEO-III Bonn, Germany		▲ 11-12 GEOSS AP Symposium Tokyo, Japan						▲ 6-15 UN-COPUS-50 Vienna, Austria		24-28 ▲ IAC-58 Hyderabad, India		▲ 5-9 CGMS-35 USA	▲ 30 GEO Summit ▲ 28-29 GEO-IV Cape Town, SA

▲: determined △: to be determined (Date, Host organization/Location) CEOS-related meetings are open only to designated participants.

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