

MINUTES OF THE 22nd CEOS PLENARY MEETING

11th-12th November 2008
George, South Africa

1 Welcome and Opening Remarks

The Chair, Pontsho Maruping, opened the meeting and welcomed participants to the 22nd CEOS Plenary. She noted that she is no longer with the Dept of Science & Technology but is delighted to continue with the responsibility of CEOS Chair and to host the Plenary. She thanked CONAE and USGS for helping prepare CSIR and South Africa to Chair CEOS in 2008.

The meeting was addressed by Hon. Godfrey Oliphant, Chair of the Portfolio Committee on Science and Technology in South Africa. He added his welcome to South Africa and his good wishes for the meeting. He gave a brief explanation of South Africa's space-related activities and technology. The history behind the establishment of the South African Space Agency was explained – with the legislation now awaiting final signature by the President.

South Africa sees international partnerships, such as with CEOS, as a vital part of their future space strategy - including on the issue of data democracy for developing countries.

The proposed agenda for the meeting was adopted.

2 Data Democracy Presentation

Alex Fortescue of CSIR presented the status of the Chair's special initiative on data democracy for developing countries:

- The objectives of the project is to secure access to data sets for applications in developing countries; it also seeks the software and tools required for effective exploitation; data dissemination and capacity development are further pillars of the data democracy idea;
- Current data access contributors include: CBERS-2B; SAC-C; Landsat; GLOBCOVER; JERS-1 and RADARSAT Africa Mosaic;
- The Advanced Fire Information Service exploits free MODIS data for a fire detection service;
- CSIR is promoting open source software in order to allow space data users cost effective access to application tools;
- A regional remote sensing training facility is being explored under the auspices of the new Space Agency; and
- GISTDA has agreed to take this initiative forward – with an emphasis on Asia.

Per-Erik Skrovseth of NSC asked about progress on geo-referenced products as a vital step to real use by government agencies. Alex answered that their 2.5m national mosaic is ortho-rectified.

Ortho-rectification will be done using a 90m SRTM DEM until a 30m ASTER-derived DEM is available.

Volker Liebig of ESA expected that GMES would expand in future to serve African users.

Lars Prahm of EUMETSAT explained that EUMETSAT has supported the Data Democracy Initiative during 2008 through the experimental dissemination of CBERS data to African users via GEONETCast. Depending on the requirements, EUMETSAT would be willing to continue to support the initiative during 2009.

Pontsho concluded the discussion by thanking the donor agencies and by hoping that the partnerships will continue.

3 Organisational and Membership Matters

Pontsho Maruping reported that

- CEOS Chair has received an application from IEEE (Institute of Electrical and Electronics Engineers) Geoscience and Remote Sensing Society (GRSS) to become a CEOS Associate; IEEE has been very active in the last few years within GEO, notably in the areas of architecture and data standards. CEOS SEC has reviewed the application and many SEC members have been working side by side with their IEEE counterparts in the ADC of GEO these past years; and
- SNSB has indicated that it would like to scale back its CEOS activities and to change its membership status from Member to Associate; Volker Liebig noted that ESA was pleased to represent all its Member states in lieu of their attendance at Plenary meetings.

The recommendation of CEOS SEC to Plenary is as follows:

CEOS Secretariat recognises the benefits of increased cooperation with IEEE and has suggested that, rather than engage as an Associate at Plenary level (which focuses on coordination of agencies with observing systems), CEOS offers to invite IEEE to discuss how you might contribute more systematically and formally to our technical efforts at the Working Group level. This would include the areas of frequency assignments (Space Frequency Coordination Group), calibration practices (Working Group on Cal-Val), standards and protocols, information system technologies (Working Group on Information Systems and Services) and capacity building (Working Group on Education, Training, and Capacity Building).

Plenary endorsed the recommendation of CEOS SEC and CEOS Chair was given an action to notify IEEE.

Pontsho noted that an informal expression of interest in CEOS Associate status had been received from GGOS – Global Geodetic Observing System, which was originally manifested as an IGOS Theme proposal in the closing days of the IGOS Partnership. In order to avoid unnecessary duplication of effort in different forums, GEOSEC was consulted as to the current status of GGOS. GEOSEC confirmed that GGOS formerly aligned its objectives with IGOS-P which has since been absorbed into GEO - operating in part within GEO ‘Communities of Practice’. CEOS SEC and GEOSEC felt that it would be more productive to invite GGOS to engage at the Working Group level on specific topics of mutual interest rather than proliferate unnecessary memberships at Plenary level. This is the proposal of CEOS SEC, and was endorsed by Plenary.

Action	22-1	CEOS Chair to send letters confirming the invitations to IEEE and GGOS to engage at the Working Group level on issues of common interest	Dec 2008
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It was also noted that NRSCC was present at Plenary and CEOS Chair will consult with them on how best to engage Chinese agencies with CEOS.

4 Earth Observation Handbook 2008

Eva Oriol reported on the completion of the Earth Observation Handbook 2008 edition:

- This edition has a special focus on Climate Change – with a background on climate change issues and the important role for Earth observations;
- The usual reference sections of timelines, and tables of missions and instruments are included;
- Samples of the Handbook content were shown – with more than 240 missions and 385 instruments detailed. 27 different measurements or ECVs are summarised using timeline charts;
- All content is available on-line at www.eohandbook.com and has a beta database capability included;
- The database has been registered as a GEOSS component; the Handbook community will be consulted on further development of online services; and
- Importantly, ESA intends to undertake an annual update of the information – assuming agencies are willing to support with inputs and review.

Eva thanked all agencies for providing their survey data and supporting its checking. Pontsho thanked ESA for a wonderful job in generating the Handbook. Chris Blackerby of NASA thanked ESA for this contribution to CEOS objectives. Savi Sachdev queried whether there was some mechanism for collecting inputs through the year rather than an annual update – and Eva responded that this was under discussion.

5 Report from the Chair: Accomplishments & Challenges

Pontsho Maruping summarised the CSIR efforts in 2008 as CEOS Chair:

- There has been a huge effort by many CEOS agencies and individuals in 2008 – notably by the CEO and by the SIT Chair;
- The CEO has worked hard to revise the CEOS IP to produce version 2 which has been circulated to Plenary;
- The SEO developed the new CEOS website and the web-based tracking tool to monitor and manage individual GEO WP tasks;
- Constellations: progress is variable across the 4 pilot Constellations but steady; the last SIT meeting agreed to pursue 2 new Constellations; Pontsho expressed the view that CEOS needs to demonstrate real achievement and there is some concern that Constellation projects could

become large and bulky rather than lightweight and short-term as seemed to be the original vision; some performance indicators may be necessary; the Constellations should stay simple and focused without complex structures; a process paper has been developed and will be put to Plenary; Pontsho recommended that CEOS not proliferate the number of Constellations but seek to maximise the existing ones;

- Data Democracy: Alex Fortescue already presented on this topic;
- Stakeholder relations: relations with WMO Space and CGMS continue to evolve and will be reported later in Plenary; GISTDA has agreed to prioritise this in 2009;
- Transition of IGOS-P: it appears there is a commitment to ensure continuity of the efforts invested in IGOS Theme teams and reports;
- CEOS Calendar: Pontsho recalled a number of recent discussions regarding the frequency of meetings at which Principals are requested to attend. There is concern that having 2 SIT meetings can result in duplication of content across SIT meetings and Plenary; it is important that Principals have an opportunity to address strategic issues as well as details of the implementation plan.

Pontsho opened the floor for questions and comments:

- Pascale Ulte-Guerard of CNES expressed the view that a single SIT meeting annually is sufficient for Principals to address CEOS business; telecons could be held as needed if necessary;
- Mary Kicza (SIT Chair) noted that there is a lot of work volume to get through and this is the conundrum; Mary recognised that Principals need not be party to much of the detail; she referenced the CGMS model where working groups undertake several days meeting before their Plenary session in the same week;
- Stephen Briggs of ESA commented that SIT has been effective in encouraging agency contributions and this should not be threatened; however it is clear this Plenary is a recent repeat of the SIT content and this does not entice high level participation; we could move SIT to May or June and have a second meeting later in the year combined with Plenary (although past attempts at this have been plagued with repetition); Stephen encouraged Plenary to address very strategic issues such as the engagement with UNFCCC COP;
- Ivan Petiteville (CEO) noted that the SIT meeting in September was very useful for building the report for both the CEOS Plenary and the GEO Plenary;
- Stephen Briggs suggested that CEOS Plenary may need to be earlier; we also need to ensure Principals continue to support SIT – but at what frequency; and
- Brent Smith noted that we have to time our meetings to suit the GEO Plenary and UNFCCC meetings annually; he suggested we need a framework to make solid contributions to these bodies – one of the challenges being the schedule of Principals; he welcomed the suggestion of a working meeting to replace a 2nd SIT meeting; Principals also need opportunities to address strategic issues; the equivalent of a summit for Principals to focus on strategy is appealing; timing of Plenary needs careful consideration.

Action	22-2	CEOS Chair, in consultation with SIT Chair and CEOS SEC, to develop a short discussion paper proposing an annual cycle of CEOS meetings - reflecting the debate at 22nd Plenary	Dec 2008
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6 SIT overview and approach in 2008

Mary Kicza (SIT Chair) reported:

- Substantial effort on remapping CEOS activities with the GEO Targets and Tasks has been undertaken by SIT Chair and the CEO in 2008; this was initiated via a December 2007 meeting with GEOSEC and a January 2008 SIT Workshop involving WG Chairs, Constellation Co-Leads, CEOS SBA Coordinators, CEO, SEO, CEOS Chair Team and SIT ChairTeam;
- Quarterly tag-ups have been held with the Constellation leads; 2 new Constellations have been initiated (Ocean Colour Radiometry and Ocean Surface Vector Winds); the SEO is now actively engaged in support to the ACC and LSI Constellations; a Process Paper for the emergence and management of the Constellations has been developed; and
- Details of the progress on the work of SIT for 2008 will follow in the relevant Plenary agenda items.

7 CEOS GEO Actions Review

Ivan Petiteville (CEO) reported:

- The GEO 2007-2009 WP was analysed to identify the CEOS contribution; some 147 actions were specified of which 60 were classed as high priority (for conclusion in 2008); there are in addition to the 59 actions specified previously in support of the GCOS IP; 17 CEOS Agencies have committed resources to delivery of results in these actions;
- Most of the priority actions rely on existing initiatives within CEOS Agencies – but regardless the level of effort in human and financial terms is very significant; about 80 agency contacts are engaged in execution of the actions and they are supported by agency staff;
- Category 1 action status: 43 actions are closed; 9 are on track; 3 actions are less than 3 months behind schedule; and 5 more are more than 3 months behind schedule; the completion rate is extremely positive and this fact needs to be conveyed to GEO to underscore the CEOS contribution;
- Lower priority actions include a number that have been closed; for many there remains insufficient definition or the lack of a lead agency;
- The CEOS Documentation Server is being used to help manage the paperwork associated with task administration;
- Several key datasets are referenced in the CEOS IP Version 2;
- More than 18 workshops and symposia have been arranged in 2008 in support of the CEOS efforts and links are provided in the CEOS IP v2;
- Next steps include: conclusion of remaining Category 1 actions; addressing the delayed actions; progressing definition and resourcing of Category 2 – 4 actions; revise CEOS tasks to reflect changes in the GEO 2009-2011 WP; conclusion of the CEOS Information System (Q4 2008); improved reporting to GEO – including the relevant GEO task team contacts; and

- It is hoped that CEOS can better advertise its achievements – including via the CEOS website, registration of all relevant assets to the GEOSS registry, and improved public outreach.

Mary stressed the need to improve awareness of CEOS achievements including with the GEO User Interface Committee. Mike Tanner of GEOSEC commented on the volume of work by CEOS and stressed the need to advertise the size of the effort and the contribution to the GEOSS. Both Mary and Mike stressed the value of the contribution by Ivan as the CEO.

8 SEO activities in 2008

Brian Killough (SEO) reported:

- The SEO is focusing on systems analysis and improved communication for CEOS;
- The SEO has developed a systems database – incorporating the missions, instruments and measurements data from the EO Handbook; the intent is to undertake some detailed gap analysis of key requirements; this aims to assist CEOS long term planning; this database is linked in the new CEOS website developed by the SEO; and
- The new site will appear at www.ceos.org in the near future.

Pontsho encouraged the SEO to progress with the website migration in the near future. The SEO's plans for 2009 include

- the development of a database tool in sync with the EO Handbook team at ESA to ensure the efforts are complementary;
- a gap analysis report with RAL will be concluded for the Atmospheric Chemistry Constellation;
- a detailed requirements assessment and gap analysis for several “threads” in collaboration with the SIT Chair; and
- a standards document and land imaging gap analysis tool in support of LSI; this tool will include analysis of coverage and revisit assessments; and cloud cover modelling to identify possible trends resulting in optimized orbit parameters for future planning.

Pontsho queried whether there is a need to have two different databases: both the new SEO database and the established CEOS Missions Instruments and Measurements database. Brian responded that some coordination will be necessary to ensure harmonisation with the EO Handbook efforts. He commended ESA for the value of the data on missions and instruments that has been compiled for the Handbook. Eva Oriol-Pibernat (ESA) agreed that avoiding duplication of effort is crucial.

Ivan gave a demo of the CEOS Information System:

- There is a single server for the CEOS Calendar and documentation;
- Google Calendar is used to identify all relevant meetings (CEOS, GEO and others);
- The same account allows access to the documentation structure, including all documentation related to GEO WP tasks, SIT, Plenary, WGs, CEOS IP etc;
- The documentation server provides for automatic indexing and searching using Google technology;

- On-line editing of documents is also possible allowing collaboration among writing teams; version histories are maintained; and documents can be published to given URLs or emailed to distribution lists;
- Forms to be completed can be sent to a mailing list; and
- CEOS is invited to use the CEOS Info Server for better communication and increased knowledge sharing and Mary noted how useful this service can be in alleviating the administrative burden.

Action	22-3 CEO to inform CEOS agencies of the login details for the CEOS Information Server	Dec 2008
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9 Climate SBA (GCOS IP) Progress in 2008

Mitch Goldberg of NOAA reported:

- 59 CEOS-GCOS actions were identified in response to the GCOS IP; these actions are being worked across CEOS by the Climate SBA Team, Working Groups, Virtual Constellations and the general membership;
- The 59 actions can be divided into six categories: ensuring continuity of climate-relevant satellite measurements (13); systematic approach to gathering FCDRs (11); preserving climate data record (4); access to climate data products (10); coordinating international communities and interaction with users (10); and future measurement needs (11);
- The 59 actions have also been divided into three priority levels: Priority 1, immediate progression, can deliver significant outcomes within 1-2 years (22); Priority 2, continuous, on-going, require additional information/definition, not expected to deliver significant outcomes within 1-2 years (32); and Priority 3, considered premature at this stage;
- The UNFCCC SBSTA has invited CEOS to provide an updated progress report at its 29th session in December 2008; this report includes a detailed status of Priority 1 actions; and
- Steps are being taken to initiate the remaining actions including 17 Priority 2 items.

Mitch presented a summary of some reprocessing activities

- The SBUV/2 data for NOAA-16 (2004 – 2007) and NOAA-17 (2003 – 2007) has been reprocessed with the latest instrument characterisation and calibration; this extends the previously released Ozone Climate Data Record (1979 – 2003) by four years; CL-06-01_1;
- SCIAMACHY data has been processed since the start of operations in August 2002; this includes products of O₃, BrO, CHNO, NO₂, SO₂, OClO, H₂O, CO, CO₂, CH₄ and properties of aerosols and clouds; this provides critical atmospheric chemistry datasets for monitoring; CL-06-02-4;
- Real-time and historical satellite products from 1981 to present from AVHRR were made available in support of the IPV; real-time products being generated for different readout sites in the Arctic and Antarctic; this has provides data for meteorological and climate studies and will be a part of the IPY legacy; CL-06-05_1;
- The SSM/I monthly products have been extended 21 years from July 1987 – June 2008; products include rainfall rates, snow cover and total perceptible water; this allow for more

accurate monitoring and change detection in climatically important surface and atmospheric processes such as rainfall; CL-06-01_3;

- Reprocessing of daily ice concentration products from SSMI for 1987 – 2007 using updated algorithms; provides critical ice cover datasets for monitoring seas ice for use in models; CO-06-01_7;
- AVHRR data from 2006 – July 2008 was reprocessed; products include clouds, land and sea surface temperatures, aerosols and vegetation index; this provides the longest satellite record of clouds, aerosols and surface temperatures for climate studies; CL-06-01_3;
- Up to 10 years of data from GlobCarbon and GlobColour have been made accessible; products include burn scar, leaf area index, fAPAR, and vegetation growth cycle; this provides essential data sets for carbon surface/air exchange studies and carbon modelling; CO-06-02-4; and
- Reprocessing will begin soon on altimetry and atmospheric products from SCIAMACHY, GOMOS and MIPAS from ENVISAT; this will provide long-term series of historical datasets; CL-06-01-4.

Coordination is underway to generate climate data records including:

- Sensor inter-calibration activities are underway including GSICS (supported by WGCV);
- R/SSC-CM providing Climate Data Records (supported by WGISS); and
- The GEWEX project supported by ISSCP, GPCP and GACP.

Plans for 2009 include

- Support to GCOS ECV requirements;
- Starting work on 17 more CEOS “GCOS” actions;
- Continuation of CEOS “GEO” Actions complementing the 59 CEOS-GCOS actions;
- Participation in the development of GSICS and RSSC-CM; and
- The development of climate teams for key FCDRs.

Darasri Dowreang (GISTDA, incoming Chair) outlined preparations for CEOS representation and side event at COP-14:

- COP-14 will be held 1 – 12 December 2008 in Poznan, Poland;
- There will be a statement by the CEOS Chair, which has been prepared by Mitch Goldberg, and expected to last 2 minutes; a CEOS side event is also planned from 18:00 – 19:30 2 December; the title of the event is “Earth observation from space for global climate change”; and
- Support materials for the CEOS contribution will include the CEOS Brochure and the EO Handbook. Anticipated attendance is approximately 100.

Action	22-4	CEOS Chair to arrange a CEOS statement and side event at UNFCCC COP-14	Nov 2008
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Paul Mason outlined the practicalities of COP-14:

- UNFCCC SEC seek to keep this item short; seeking to have an in depth discussion at Bonn next June;

- GCOS express appreciation for the enormous amount of work being undertaken by CEOS in response to the GCOS IP; the key thing is increased delivery to the users; and
- GCOS sees the Constellations as a valuable way of optimising the capabilities of available research instruments, though notes they are not yet operational and that CEOS needs to consider how to sustain the capabilities.

10 Virtual Constellations Progress in 2008

10.1 Atmospheric Chemistry Constellation

Brian Killough of NASA reported:

- 4 near term projects to demonstrate the Constellation concept are progressing quite well and are in implementation phase;
- A requirements and gap analysis was completed by RAL in October 2008; this was further developed by the ACC-3 workshop; it reviewed the status of on-going and planned research to develop AC Climate Data Records and ECVs; the report on the gap analysis can be found on the new CEOS website;
- High resolution ozone profile measurement gap from 2013;
- The impacts of data gaps on climate modelling have been considered; these include gaps in future limb profiling and occultation measurements which will limit stratospheric ozone chemistry; and gaps in the measurement of carbon sources and sinks, aerosols and air quality;
- The post-ACC-3 workshop plans include an update and refinement of the gap analyses and missions timelines; detailed aerosol measurement analysis; summary of ACC instrument capabilities; and a review of requirements for climate and air quality visit times;
- A set of recommendations will be delivered to SIT-23 in March 2009; CEOS should work to identify urgent gaps that need immediate action; longer term data and modelling studies are recommended that take gaps and other data deficiencies into account;
- Discussion is ongoing with WGISS about an AC data portal;
- The ACC-4 Workshop is planned for June 2009 in Frascati (hosted by ESA);
- The US and Europe have major Earth Science mission plans that include AC opportunities including the US Decadal Survey, ESA Earth Explorer missions, GMES, NPOESS, Metop, Post EPS as well as collaboration among JAXA, NASA, ESA, EUMETSAT and NOAA; and
- **Areas for possible collaboration include algorithms, calibration and validation, technology development, mission coordination, data distribution and planning for advanced missions and new applications.**

10.2 Precipitation Constellation

Chris Blackerby of NASA reported:

- The 3rd GPM International Ground Validation Workshop was held 4-6 March 2008 and the 2nd CEOS PC Workshop in Tokyo on 5-6 June 2008;
- GPM Mission PDR at NASA is currently underway;

- All 4 CEOS Category-1 Actions are complete; DA-07-03_2, coordination of international GPM ground validation; CL-06-02)2, precipitation data availability; DA-07-03_6, precipitation processing system; and DA-07-03_1, an inter-comparison study;
- 2 of the 6 CEOS Category-2 actions are complete; WA-08-P1_3, conversion of HDF formatted 3h global rain rate products to GIS format; and WA-08-P1_4, enabling users to create dynamic geographic subsets of TRMM rain products via the Precipitation Processing System; the remaining Category-2 actions are on track;
- The CEOS Category-4 action has been completed; WA-08-P1_7, GPM mission ground validation working group use satellite and ground data to investigate key issues of combination over co-located sites;
- Future challenges include: formalisation of international agreements; enhancing measurement capabilities in polar latitudes; exploring opportunities to include additional space-based and ground assets from other nations to augment the next generation of sensors for the PC;
- **The Precipitation Constellation team requests that NRSCC/NSMC identify a POC for the PC and make radiometry data from the recently launched FY-3 MWRI and MWHS imager and sounders; that ROSHYDROMET identify a POC for the PC and make available radiometric data from the MTVZA sounder/imagers; and that CNES/ISRO confirm their approach to obtain capability to acquire Megha-Tropiques data in near real-time; and**
- A CEOS Precipitation Constellation website is available at ceospc.gsfc.nasa.gov.

10.3 Land Surface Imaging Constellation

Bryan Bailey of USGS reported:

- Unfinished 2007 tasks are being concluded;
- A new radar focus area is being developed; and an initial project being discussed in relation to forest mapping and carbon monitoring;
- Regional data sets are being advanced: a letter has been sent to CEOS Principals of agencies operating mid-resolution systems seeking data contributions to the regional data sets and to GLS2010;
- The LSI Constellation Portal developed with WGISS will be demonstrated to the GEO Plenary;
- Current challenges for LSI include dedicating sufficient personnel resources to get the required work done; gaining favourable responses from mid-resolution agencies to LSI; and sharing the leadership responsibilities;
- Future challenges for LSI include charting the “right course” for LSI; accommodating leadership transitions in LSI; generating and maintaining momentum; and dedicating sufficient personnel resources to LSI; and
- **The LSI team requests that agencies prioritise the LSI activities; provide staff to formulate and conduct plans for the LSI constellation; agencies with mid-resolution optical LSI systems to lead and/or support the three cooperative projects related to last year’s Declaration of Intent; agencies with radar systems to participate in WGR activities; and all agencies to respond positively to requests for data contributions in support of LSI activities.**

Action	22-5 CNES, CONAE, ISRO, NASA, and USGS Principals to respond to the 13 June 2008 LSI Constellation letter requesting data contributions to the regional datasets	Dec 2008
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10.4 Ocean Surface Topography Constellation

Paul Counet of EUMETSAT reported:

- First calibration results of Jason-2 are very promising based on comparison with Jason-1; the importance of overlap between the operational missions was stressed;
- The status of missions in development and in planning was reviewed; CryoSat2, late 2009; SARAL, early 2010; HY-2A, June 2010; Sentinel-3A, 2012; Jason-2 and Jason-CS, in planning; OST Constellation, strategy under development; SWOT, feasibility study; and
- CEOS support is requested in helping to secure a Jason-2 follow-on in time to provide data continuity in addition to recurrent units for the Sentinel-3 mission.

OST requests the following support from SIT and CEOS:

- **Help to resolve the approach and secure funding for an OSTM/Jason-2 follow-on in time to provide data continuity;**
- **Be prepared to respond to the mission requirements document for the Constellation when it becomes available in early 2009; and**
- **Engage key officials of China's SOA to collaborate on altimetry, to extend data availability beyond that available from the existing constellation**

Volker Liebzig noted that Sentinel-3B will be discussed at the ESA Ministerial in a few weeks.

Action	22-6 CEOS Agencies to respond to the OST Mission Requirements Document when it becomes available in early 2009	Mar 2009
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10.5 Ocean Colour Radiometry Constellation

Martha Maiden of NASA reported:

- Planned OCR missions were shown and concern expressed that data availability may be reduced in future; 3 independent missions in orbit at one time are recommended to ensure adequate global coverage;
- There may be heavy dependence on ESA's Sentinel-3 and OCM-2 of ISRO;
- The OCR-VC study team will be co-chaired by JRC (EC) and JAXA;
- Phase 1 activities (2008-2012) may include: calibration and validation efforts; data quality studies; data merging; product generation; applications and new technologies, and research and development.
- **Requested agency commitments include: representation at study team meetings; fund and encourage participation in activities that agency leads oversee; access to satellite data; encourage production of new and improved products.**

10.6 Ocean Surface Vector Winds Constellation

Paul Counet of EUMETSAT reported:

- User community engagement will focus initially on operational forecasting for Southern Hemisphere via provision of OSVW & SWH; assess whether GMDSS high-seas forecast centres have timely access to, and capability to use, products; existing GMDSS links will deliver forecasts to end users; extend to Northern Hemisphere and resolve issues; extend to WMO tropical cyclone forecast centres; and then consider additional products and applications;
- Measures of success will include: timely data access (ISRO/EUM/NOAA discussions re Oceansat-2 SVW; SOA not yet discussing HY-2); one-stop shopping (consider putting QuickSCAT and ENVISAT SWH data onto GTS); operational utilisation (consider a workshop); improved on-orbit capabilities; and
- **Recommended actions are for CEOS/SIT to encourage the establishment of OSVW Constellation and invite SOA to participate in CEOS; ISRO/EUM/NOAA/SOA to consider joint discussions on common products and formats; NOAA to consider putting QuikSCAT SVW onto GTS as EUM has done with ASCAT; ESA to consider putting ENVISAT SWH onto GTS as MétéoFrance has done with Jason; NOAA/EUM/ISRO to consider organising a joint workshop for operational users; and NOAA and EUM to consider follow-on options to improve performance and maximize coverage.**

Stephen Briggs noted that the ENVISAT data requested by OSVW Constellation is already on the GTS and has been for some time.

10.7 CEOS Constellations Process Paper: Discussion on Status of Constellations

Mary Kicza (SIT Chair) explained the background purpose of the paper, namely the description of the process of definition and delivery of CEOS Constellations. The key elements of the process paper were explained. Mary noted that the initial Constellations were developed without the benefit of a Process Paper. Plenary is requested to endorse the Constellations Process Paper to help steward the Constellations process.

Mary noted that ISRO has established a co-lead for the OSVW Constellation and a replacement co-lead for the LSI Constellation.

Mary expressed concern about the LSI Constellation. Its not clear that the support is forthcoming from agencies for their objectives. Bryan noted some improvement in responses recently with INPE and JAXA expressing an interest.

Lars reported that at CGMS last week there was discussion with Chinese agencies regarding their ocean data. It has been agreed with SOA that EUMETSAT will have access to their ocean colour and altimeter data.

Stephen Briggs thanked Mary for her support in defining the Constellation Process.

Savi Sachdev reported that SCISAT (supports ACC) will be extended for a further 3 years, and an extension of RADARSAT-1 operations is also planned.

Pascal Ulte-Guerard of CNES expressed surprise at the lack of mention of the studies being looked at by GEOSEC regarding commercial constellations. Mike Tanner noted that he would discuss this later in the agenda.

Pontsho proposed that CEOS endorse the Constellations Process Paper as drafted by NOAA – this was seconded by both CSA and USGS, and approved by all.

11 Summary of GEOSS Space Segment Progress in 2008

11.1 CEOS Report to GEO-V Plenary

Ivan Petiteville (CEO) reported:

- CEOS will provide a short report to GEO-V: each WG Chair, Constellation and SBA Lead has been asked to nominate 1 action (total of 14) to discuss; these have been further reduced to identify highlights and major achievements;
- Inclusions are: more than 30 new datasets registered in GEOSS (GlobCarbon, ALOS Kyoto and Carbon, ECVs for polar regions); key documents including the 2008 EO Handbook; thematic web portals – for climate and LSI; installation of 4 additional carbon flux towers in Africa;
- It was suggested that the report should also address the CEOS priorities for 2009; Ivan mentioned 4 candidates;
- Stephen Ward suggested that CL-09-03 (a) and (b) should be priorities given the significance of COP-15 in 2009 and of the post-Kyoto framework for discussion in Copenhagen. (CL-09-03: Global Carbon Observations and Analysis System; (a) Forest Carbon Tracking; and (b) Global Monitoring of Greenhouse Gasses from Space). Mary Kicza and Stephen Briggs agreed – Stephen suggested that space agencies need to stay close to the climate process in 2009 and this will become the number one issue. He referred to the Eliasch Report on financial instruments for monitoring carbon trading – politicians are beginning to ask specific questions and space agencies need to be able to respond. This is a priority for ESA and hopefully for CEOS too. Mary suggested that this is a key thread for the next SIT meeting and will require linkages to the *in-situ* community. Julio Dalge (INPE) referred to the CBERS task as ongoing;
- Pontsho noted that there was consensus on the climate-related tasks CL-09-03 (a) and (b) being 2009 priorities for CEOS on the GEOSS Space Segment; and
- **Ivan will circulate the draft oral report for GEO-V Plenary and provide an opportunity for CEOS to review one last time in advance.**

Action	22-7	CEO (on behalf of CEOS Chair) to deliver a report on progress towards implementation of the GEOSS space segment in 2008 to the GEO-V Plenary in Bucharest	Nov 2008
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11.2 CEOS IP V2

Ivan Petiteville (CEO) reported:

- The CEOS IP comprises 3 parts: An introduction; details of the actions, milestones and delegation of responsibility and CEOS co-ordination with other bodies; and a section on the “Way Forward”;
- 87% of Category 1 actions are either closed or on track; a number of new documents, datasets, and workshops were organized or supported in 2008;
- The “Way Forward” section focuses on CEOS leadership of GEO Tasks; CEOS actions definition and execution; CEOS, CGMS and WMO coordination and support to GEO; Virtual Constellations; revision of the GEOSS 10 year plan targets; improvements to the IP management process; CEOS resource registration in GEOSS; and analysis of gaps between needs and implemented space components; and
- **Next steps are: to update the document based on Members’ comments; update Part 2 in early 2009 to take into account on-going Cat-2 to 4 actions and the definition of the new CEOS actions following approval of the GEO 2009-2011 Work Plan; and update Part 3 to reflect the completion of several Cat 1 actions in Q4 2008.**

12 CEOS Preparations for GEO-V

Darasri Dowreang (GISTDA, incoming Chair) reported:

- GEO-V Plenary will take place in Bucharest on 17-20 November 2008;
- Ivan Petiteville will deliver the CEOS report to GEO-V; and
- CEOS will arrange some exhibitions at GEO-V – including the LSI Portal and the Climate Diagnostics Portal. Development of these portals was supported by WGISS. The Climate portal is based on the IDN.

13 GEO Report

Mike Tanner (GEOSEC) reported:

- GEO now has 77 Members and 51 Participating Organisations;
- There are 7 target areas for GEOSS architecture;
- The G-8 Toyako Summit produced a declaration on environment and climate change that identified the importance of accelerating GEOSS; and
- GEO Secretariat Staffing was shown and Mike explained that the group was somewhat under-staffed at present.

The 2009-2011 GEO Work Plan was discussed and it was noted that CEOS comments on the early drafts were most helpful. The new Work Plan seeks to be cross-cutting, to enhance data sharing, to take benefit of the IGOS Themes transition into GEO, and to realise the potential of the Communities of Practice. A much stronger user-driven approach is evident. The GEO Committees will be asked to take a much greater role in the governance of GEOSS.

The discussion continued:

- The GEOSS Common Infrastructure includes a web-based portal, clearinghouse for searching data, information and services, registries of GEOSS components, standards and best

- practices; contributions from each committee have been made via GCI Initial Operating Capacity Task Force;
- Development and implementation of GEOSS Data Sharing Principles is a top priority; the aim is to build consensus for the adoption of the Principles at the GEO-VII Plenary and Ministerial Summit in 2010;
 - A new group - the C4 - takes responsibility for ensuring that Co-Chairs of various Committees share information and ideas;
 - GEOSEC is working with WMO to organize the World Climate Conference 3 in August 2009; GEOSEC is arranging a meeting with WMO, WCRP and GCOS in early 2009 to better organise the GEOSS climate component;
 - The Iridium Secondary Payload opportunity was discussed: the constellation comprises 66 satellites and has capacity for secondary Earth observing missions; 4 missions have been studied – altimetry, GPS RO, Earth Radiation budget, ocean/land imager; the Constellation will be launched within a few years so the approach by Iridium may be too late; Globalstar has also contacted GEOSEC and is interested in the possibilities;
 - Alternative funding: GEOSEC is talking to a number of foundations to explore possibilities for their funding of GEOSS initiatives;
 - The International Charter for Disasters has accepted the concept of granting direct access for activation of the Charter;
 - GEO-V in Bucharest was discussed including plans for the exhibition;
 - The Data Sharing Principles and guidelines were discussed. CODATA has helped to draft the White Paper on the subject; full and open exchange of data, metadata and products is called for; data sharing implementation guidelines were shown;
 - Near-term milestones for the implementation of Data Sharing Principles have or will include: the GEO ADC, UIC and STC taking active roles; a data policy workshop in Quebec City; data sharing session at the AIP kick-off; a data sharing session at CODATA in Ukraine; and a data sharing guidelines side event at GEO-V;
 - Longer-term milestones for the implementation of Data sharing Principles include: development of working data sharing policies and procedures consistent with the GEOSS Data Sharing Principles; formalization of data sharing policies and procedures by major GEO initiatives such as GEONetcast, GEO BON, GAM and others; GEOSS Common Infrastructure and Initial Operating Capability should begin to incorporate tools to implement data sharing policies and procedures;
 - The reality of GEOSS is as a system of systems – the biggest challenge is data and not system interoperability; and
 - GEOSS future directions were summarised including the implementation of GEO Data Policy Guidelines; Global Earth Observing Systems Inventory; assessment of observation gaps; implementation of operational tools like GEOPORTAL and GEONETCAST; demonstration of national, regional and global observation programs in support of health, agriculture, water and capacity building; promotion of EO in modelling and data assimilation efforts; GEOSS cost/benefit analysis; explore ways to sustain successful R & D observations; and engage academic and industrial partners.

Mary Kicza asked if the Communities of Practice had identified points of contact. Mike confirmed that this information is in the Annex of the new Work Plan. GEOSEC will press hard for the UIC to reach out to the CoPs and to keep them active.

Pontsho asked when GEOSEC will start to plan for the 2010 Ministerial and the role for CEOS. Mike expected that progress on data access will be key, as well as the principles which have been agreed for access to future datasets.

Julio Dalge asked if there were any concrete actions in addition to INPE's CBERS data and the USGS archive. Mike suggested that there are positive developments and agreements that will need further implementation to be realised.

14 Space Segment Priorities in 2009

Mary Kicza (SIT Chair) reported:

- The SIT approach, objective and goals for 2009 will remain the same as 2008; 2009 goals include continued strengthening of CEOS linkages to GEO and GEOSS; advancing the Constellations; and alignment of SIT structure to support these efforts;
- Implementation plans will be developed for the Ocean Colour and Ocean Surface Winds Constellations;
- SIT in March 2009 will seek to identify half a dozen topics for strategic consideration in 2009 and beyond; specific pressing questions will be identified and a way forward defined; and
- Upcoming SIT events were summarised: 3rd – 4th December 2008 is the 2nd CEOS-GEO Remapping Meeting; 27-28 January 2009, 2nd SIT CEOS-GEO Workshop; 3rd – 5th March 2009 is SIT-23; 9th – 11th September 2009 is SIT-24, meeting at working level.

Action	22-8	SIT Chair Team, CEOS Chair Team, CEO, and SEO to meet with GEO Secretariat in early December to assess results of GEO and CEOS Plenaries and communicate results to CEOS	December 2008
Action	22-9	CEO, CEOS Chair Team, SIT Chair Team, SEO, WG Chairs, Constellation Co-Leads, and CEOS SBA Coordinators to be represented at SIT Workshop, 27-28 January 2009, in Silver Spring, MD	27 January 2009
Action	22-10	CEOS Principals urged to participate in SIT-23, 3-5 March 2009 in Cocoa Beach, FL	3 March 2009

14.1 Proposed 2009 CEOS GEO Actions and Commitments

Ivan Petiteville (CEO) reported:

- 13 CEOS Points of Contact for the new GEO Tasks have been identified (see below); these POCs will officially be designated after GEO-V.

CEOS Task	Lead/Lead Agency	Suggested CEOS POC
CB-09-05b: CEOS	Brazil/INPE and CEOS	INPE or CSIR
DA-09-01b: CEOS Country Assistance Strategy	CEOS and IREE	P. Lesante (WGCV)
DA-09-01c: Info. Metadata and Products Administration	USA (NOAA) and CEOS	WGSS
AR-09-02a: Virtual Communities	CEOS and GCOM/GOFC/GCOM	M. Kacra (SIT Chair)
CL-09-02a: Free Climate Data from Satellite Sensors (GCOS)	USA (NASA, NOAA), CEOS, GCOM and WMO	M. Golberg (Climate)
DA-09-02a: Global DEM	Japan (Ministry of Tokyo) and CEOS	J. P. Miller (WGCV)
CL-09-03b: Forest Carbon Tracking	Australia, Japan, Norway, CEOS, FAO, GCOM	F.E. Skrevelth (NSC), A. Held (CSIRO)
CL-09-03c: Global Monitoring of Greenhouse Gases from Space	Japan (JAXA), USA (NASA), CEOS and ESA	JAXA
DI-09-09: Use of Satellites for Risk Management	Canada (CSA), China (CARSA, NEMCA), CEOS and UNADCSA	G. Sugam (Disaster)
HE-09-03b: Globally distributed marine warning system	CEOS	J. Valera, I. Eogan (NOAA)
EN-07-01: Management of Energy Systems	Germany (DFG), CEOS and IREE	R. Felman (Enraps)
WA-09-07b: Africa (TIGER)	USA (NASA) and CEOS	D. Fernandez Prieto (ESA)
CL-09-04a: Sustained Reprocessing and Reanalysis of Climate Data	CEOS and GCOM	Mitch Golberg, (Climate)

Action	22-11	CEOS points of contact for the new GEO WP Tasks to confirm their willingness to serve (CEO will coordinate)	Dec 2008
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Ivan further reported:

- CEOS, CGMS and WMO coordination and support to GEO are ongoing;
- The revision of the GEOSS 10-year plan Targets will continue to be studied in early 2009 with the aim of formulating a long-term planning response to the revised GEOSS Targets; and
- CEOS has registered 35 of 130 components and 38 of 113 services in the GEOSS Registry, but this can be improved; all CEOS Agencies are encouraged to register their main resource support to GEO.

Action	22-12	CEOS agencies are encouraged to register their available resources as contributions to GEOSS	Feb 2009
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14.2 Gap Analyses

Brian Killough (SEO) reported:

- Points of Contact for the new CEOS GEO Tasks were identified;
- Gap analyses for CEOS, discussed at SIT-22, is proceeding focused on a few focused “threads” with the aim of enhancing understanding of the requirements, the impact of CEOS missions and potential measurement gaps;

- The approach has been to engage appropriate GEO CoPs; conduct interviews with the modelling community and instrument or mission scientists; and gather results and analysis information in an online systems database to understand relations between system elements; and
- Mary Kicza noted that Water, Carbon, Energy and Cryosphere have been identified as preliminary ideas for thread topics; Lars Prahm suggested that sea level measurements are crucial and under threat and should be addressed by CEOS; Stephen Briggs noted that deforestation and REDD had already been agreed as a priority for 2009 and should be added; this was supported by Per Erik Skrovseth of NSC.

Action	22-13	SIT Chair and SEO to circulate preliminary priorities for gap analyses in 2009 and CEOS agencies to review, comment, and provide additional priorities for consideration	Dec 2008
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14.3 JAXA's initiative to accelerate implementation of the GCOS and GEOSS

Makoto Kajii (JAXA) reported:

- The G-8 Toyako Summit agreed to accelerate the GEOSS activities in priority areas of climate change and water resource management;
- The background to the two JAXA Earth Observation Seminars of 2008 was presented;
 - JAXA proposed 4 monitoring systems as part of this initiative: The Forest Carbon Monitoring System (FCMS) – the subject of the new CEOS GEO WP Task; The Greenhouse Gases Monitoring System – including observations by OCO and GOSAT – and JAXA has proposed a new framework to progress this; Global Water Cycle Monitoring System (including GPM); Global Disaster Monitoring System – including Sentinel Asia;
- JAXA proposes that CEOS Agencies should consider reporting back to G-8 via GEO; and
- JAXA's international GHG group is a real concrete action following up on the Toyako Summit.

Pontsho queried what mechanism CEOS would use to report back to the G-8. Brent Smith suggested that this could be through individual Ministries.

Action	22-14	JAXA to report on the status of the new GHG coordination task at SIT-23 (recognising this is a CEOS priority in 2009)	SIT-22
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14.4 New activity in support of REDD

Per-Erik Skrovseth (NSC) reported:

- The Task now falls under the Climate SBA;
- The context is to support the political requirements related to the UNFCCC negotiations; this is a window of opportunity for political attention towards COP-15 in Copenhagen at the end of 2009; it is a chance to demonstrate capability to develop a consistent, long-term forest carbon monitoring system;

- Tropical areas are the priority as the areas where deforestation is most severe;
- The GEO Task seeks to establish several regional reference test sites to demonstrate the capability in support of climate policy needs. In addition it will: consolidate observational requirements and associated products; coordinate observations; coordinate assessment of tools and methodologies; coordinate production of reference datasets; and improve access to observations, datasets, tools and expertise and associated capacity building activities;
- Donor countries have been identified; countries with test sites must have some capability to support ground observations; forest management authorities in test site host countries must be involved; resources for the data analysis must be identified;
- The desirable characteristics of suitable test sites were discussed; candidates are in the Brazilian Amazon, Borneo, Tanzania and Tasmania; UN REDD (FAO) will shortly specify additional sites;
- Candidate SAR data sources were reviewed, including: ALOS, ERS and Envisat, and RADARSAT-2;
- CEOS Support requested is: LSI Constellation Team with GOF/GOLD to help define and make available geo-referenced optical and SAR data; LSI Constellation team to assist in developing a strategy for continuous, systematic observations to demonstrate capability over test sites; CEOS agencies through nominated POC to help specify SAR modes;
- SAR data modes and products to be identified together with SAR forest monitoring community to be done by end January 2009 and a SAR and optical acquisition strategy ready for execution by end February 2009;
- Stephen Ward asked who is actually leading the project – Per Erik noted that more human resources are required to realise and coordinate progress;
- Mary Kicza asked when the team is going to meet;
- Per Erik will draft a letter seeking response on the choice of SAR modes; and
- Stephen Briggs expressed ESA support for the task; he noted the political profile of this task. It needs to answer the simple financial question as to how to make it worthwhile for a community to maintain rather than harvest trees; and how to monitor compliance?

Action	22-15	NSC and CSIRO to organize a task team and develop a project plan designed to deliver the demonstration of the Forest Carbon Monitoring System ahead of COP-15 (recognising this as a CEOS priority in 2009)	Feb 2009
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14.5 Closing discussion

Mary conveyed a message from ISRO who confirmed that Dr B.S. Gohil will co-lead the OSVW constellation and will continue their support for CEOS and SIT – including by attending the next SIT meeting. Oceansat-2 is due for launch in March or April 2009.

Chris Blackerby passed on a message from Mike Freilich of NASA that he continues to see CEOS as a vital instrument and NASA will continue to play a leading role including its support of the SEO, Working Groups and Constellations. Mike will attend the next SIT meeting.

Savi Sachdev of CSA noted that they will continue to lead the risk management task and will support the new FCMS task – a point of contact has been identified.

15 CEOS Executive Officer Report

Ivan Petiteville reported on the activities of the CEOS Executive Officer since the last CEOS Plenary. Activities and achievements include:

- Identification, coordination and monitoring progress of CEOS priority tasks from the GEO 2007-2009 Work Plan;
- Assembly of the CEOS SBA Teams;
- Liaising with CEOS WG Chairs;
- Preparing the CEOS report to the GEO-V Plenary;
- Direct involvement in the GEO ADC as Co-Chair representing CEOS; and
- Updating the CEOS IP to version 2.

Ivan noted several challenges facing the CEO which he is working to mitigate:

- Complex and time intensive coordination both internal to CEOS and externally;
- Number of meetings; and
- Increasing documentation burden.

Ivan concluded by reporting that

- there is too much work for one person under the CEO portfolio;
- there is great motivation and support amongst staff of the CEOS Principals; and
- the CEO has strengthened relationships with other bodies.

Ivan thanked the CEOS membership, GEO SEC and others for their support.

16 WGISS Report and Actions

Martha Maiden gave a presentation reporting on the activities of the WGISS since the last CEOS Plenary.

- The WGISS Vice Chair is currently Pakorn Apaphant, a member of the incoming GISTDA CEOS Chair team;
- Current WGISS focuses include support to GEO and the CEOS Virtual Constellations, close collaboration with WGCV and support to the CEOS Data Democracy initiative;
- WGISS-26 was held in conjunction with several GEO committees in Boulder, USA, September 22-26;
- WGISS also participated in WGCV-29, with particular focus on the global DEM task; and
- WGISS currently has 5 closed and 5 open GEO-related actions which it is working on.

Major WGISS accomplishments since the last plenary include:

- Completion of the WGISS Task Force – CEOP Project at WGISS-26;
- GRID computing project results, for example flood modeling;
- Formation of a number of WGISS interest groups including a group on Sensor Web supporting multiple projects including Data Democracy; and groups in support of the LSI, ACC and Precipitation Constellations; and
- WGISS was represented at the Co-Data Conference, UN-SPIDER Workshop, the XXI ISPRS Congress and UNGAID.

The way forward for 2009 will focus on:

- New GRID projects;
- A focus on Web Services;
- Collaboration on ACC Portal led by NASA; and
- Global Datasets like the global DEM.

WGISS requires support in the following areas:

- More expertise from agencies in support of ACC; and
- New members interested in a Data Services interest group.

Martha's (NASA's) term as WGISS Chair ends at CEOS Plenary in November 2009 when Pakorn Apaphant (GISTDA) will take over. A new Vice Chair will be appointed at that time to follow Pakorn and GISTDA. Letters expressing interest in the Vice Chair role should be sent to the WGISS Chair by agencies by March 31, 2009.

Action	22-16	Letters expressing interest in the WGISS Vice Chair role should be sent to the WGISS Chair by agencies by March 31, 2009	March 2009
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17 WGCV Report and Activities

WGCV Vice-Chair Pascal Lecomte gave a presentation reporting on the activities of the WGCV since the last CEOS Plenary. Accomplishments include:

- Leading GEO cross-cutting Task DA-06-02 to develop a quality assurance strategy for GEOSS – including QA4EO;
- Completing two CEOS 2008 category 1 actions;
- Signification contributions to DA-07-01 on global DEM data set development; and
- Completion of all WGCV 2008 CEOS Category 1 actions and good progress on Category 2 actions.

One of the major challenges WGCV is looking at is the creation, resources support and implementation of data quality assurance guidelines to help ensure consistency between satellite observations. In response to DA-06-02, ten key guidelines were endorsed by the WGCV at their

29th plenary meeting in Avignon, France in September / October 2008 and were presented to the SIT in October 2008. **The WGCV recommends that CEOS endorse the Quality Assurance Framework for Earth Observation and encourage its rapid implementation within member agencies.**

Mitch Goldberg, on behalf of GSICS, commented that its an excellent document but is over-specific in some areas. Lars Prahm also agreed that this is an excellent starting point but agreed too with Mitch's comment and noted the need to concentrate on what should be done as opposed to who should do it. Jerome Lafeuille supported these comments and suggested that the domain of applicability be carefully reviewed; he suggested a closer cooperation among GSICS and the WGCV in this respect.

In support of GEO task DA-07-01 WGCV has prepared "Guidelines on Global DEM inter-operability", including 30 recommendations and 15 actions. **While good progress has been made in recent years, WGCV and WGISS stress the importance of DEMs for GEO societal benefit areas and downstream EO data services and therefore recommend that CEOS member agencies agree to co-operate in the completion of a complete, gap-free and validated DEM by an agreed goal of June 2010 and no later than June 2011, following the DEM inter-operability guidelines.**

WGCV further recommends that:

- CEOS Members include their Infrared and Visible Optical Sensors (IVOS) in inter-comparison exercises and support the relevant staff to participate in the activities; and
- CEOS encourages satellite agencies (esp. NASA and NOAA) to participate in the air quality ground instrument inter-comparisons organised by ESA.

WGCV leadership has changed with Changyong Cao of NOAA completing his two-year term (2006 – 2008), being replaced in connection with the CEOS Plenary by the former WGCV Vice Chair Pascal Lecomte of ESA who will serve for the period 2008 – 2010. Gregory Stensaas from USGS was elected as the new WGCV Vice Chair for the period 2008 – 2010 and will become WGCV chair for the period 2010-2012.

Mary commented that CEOS appears to endorse the documents with the caveat that the concerns expressed will be addressed. Pascal responded that the guidelines are flexible and will evolve in future with as much participation as possible including support from GSICS..

It was confirmed that CEOS endorses the QA Framework for EO document; and WGCV Chair undertook to address the comments expressed at Plenary.

Pontsho thanked Changyong Cao for all his invaluable support over the previous years as Chair of WGCV.

18 WGEdu Report and Actions

Gordon Bridge gave a presentation reporting on the activities of the WGEdu since the last CEOS Plenary. Accomplishments include:

- Education and courses, workshops, summer schools and other activities in support of EO technology and application development;

- Current three year strategic plan focuses on the WGEdu Education Portal; Remote Sensing Workshops; testing access to category 4 data for educational and capacity building purposes; and
- Currently developing a closer relationship with the CEOS Constellations and GEO Capacity Building activities.

Current activities include:

- The WGEdu is looking at options to make the educational portal fully operational as a key resource for GEO; options include continued hosting with EUMETSAT, or consideration of an alternative site, e.g. COMET's Environmental Satellite Resource Centre;
- "Remote Sensing for Disaster Management" workshop (3rd) in Bangkok, Thailand in the first week of February 2009, hosted by GISTDA;
- Pilot Projects to test the implementation of the WGEdu Data Access Principles by for educational and training purposes including non-commercial and commercial data sources;
- Looking at potential CB components of the Virtual Constellations with assistance from the SEO in assessing potential support roles (e.g. co-sponsored Workshop) in the context of the ACC, and potentially other Constellations; and
- Engaging with the GEO Capacity Building Committee, supporting the space-based EO component of GEO CB activities.

WGEdu is currently looking to expand its membership, including staff from existing education and training programs within CEOS Agencies. Alex Fortescue confirmed that CSIR is willing to send Philip Frost to attend the GISTDA workshop to offer a training module on the fire system that he helped to develop.

19 IGOS Partnership Update

Bryan Bailey presented an update on IGOS activities since the last Plenary:

- The transition of IGOS-P Themes to GEO, underway since May 2007, was outlined in a "Themes Transition Process Paper" in November 2007, and was formally adopted by the IGOS Partners in May 2008;
- With the transition of the themes to GEO agreed, the IGOS Partnership was formally dissolved at IGOS-P-15 in May 2008; and
- Planning is underway for an Earth Observation Symposium to display IGOS achievements, and to provide an update on the progress of the transition of IGOS Themes to GEO that will be held in advance of the GEO-VI Plenary in November 2009.

Pontsho queried whether actions are necessary to ensure continuity of the critical mass and knowledge assembled under IGOS Theme teams and reports and Bryan answered that he felt GEOSEC was ably attending to this duty. Barb Ryan (WMO) supported this opinion and added that Greg Withee has been named Chair of the Programme Committee for the proposed Symposium and that Mike Tanner is the contact on the GEO SEC side. Brent Smith recalled the action agreed in Hawaii for agencies to continue support of IGOS Themes and noted that the Themes are very much involved in the SIT plans for 2009.

20 Report from GCOS

Paul Mason presented on recent progress on the GCOS Implementation Plan:

- The GCOS strategy focuses on working with experts and partners; engaging agents for action and for policy including UNFCCC/COP/SBSTA and other intergovernmental bodies like GEO and CEOS; and developing strategies for resource mobilisation;
- GCOS was invited by SBSTA to provide a comprehensive report on (mid-term) progress with the GCOS IP at its 30th session in June 2009; GCOS plans a 30-40 page report with executive summary aimed at UNFCCC, WMO etc;
- The 2009 IP is currently being updated, with the aim of finalisation in Summer 2009; a small group is leading the work – supplemented by a formal process of open review; much of the satellite supplement will be incorporated; more emphasis will be given to regional adaptation;
- The proposed schedule was shown:

Action	Time Period
1 st meeting; Outline of Progress Report	30 June – 2 July 2008
Assessing progress against GIP Synthesis of Parties' additional submissions	Ongoing; 15 Sep – Nov 2008
2 nd meeting progress report drafting meeting	24-26 November 2008 (27 Nov: PM, JR)
Progress Report Draft v2.0	15 March 2009
Closure Meeting (Editor, Chair(s), Secretariat, experts)	2 nd half of March 2009
Submission of Final Draft to UNFCCC Sec	15 April 2009
Final Draft Open Review	1 May – 20 June 2009/until after SBSTA-30
Finalize Report	July 2009
Expert meeting on 2009 Update of the GIP	2-5 February 2009
Work on Draft at Progress Report Closure Meeting	2 nd half of March 2009
IP update Closure meeting (Editor, Chair(s), Secretariat, experts)	May 2009
Draft v2.0 Open Review	1st June 2009 – 28 th Aug
Finalize Report	Oct 2009 or Feb 2010 depending on SBSTA wish to comment

- Priorities include immediate science objectives; benefits from timely and “easy” actions; and ensuring long term time series; and

- A number of key climate change issues have been identified and linked to key ECV data sets required for their analysis, including: the hydrological cycle; ice sheets; radiative forcing; the carbon cycle; and regional impacts.

The Sydney review meeting firmly endorsed the GCOS ECV list. The meeting formally recommended adding soil moisture to the list. More detail was noted as being necessary for some ECVs.

Paul, on behalf of GCOS, thanked CEOS Agencies for their vigorous engagement with the GCOS IP, and would welcome further agency staff participation in the preparation and review of the Progress report and IP update.

Paul noted that about 90% of the GCOS IP needs are not exclusively covered in the GEOSS Climate SBA but rather are distributed across all 9 of the SBAs.

Stephen Briggs thanked GCOS for the every constructive engagement with space agencies over the past few years. ESA is willing to support the work of GCOS planned for 2009. He asked Paul to clarify the CEOS report update and what report this is. Paul was referring to the progress report that CEOS has submitted to COP-14. The CEOS report will likely be discussed mainly in concert with the GCOS report at SBSTA next June. Mitch clarified that he has organised the detailed report on progress by CEOS.

Lars expressed strong support for the GCOS activities and highlighted the importance of their independence in the process.

Paul noted that the SBSTA meeting will be approximately 1-10 June in Bonn, Germany. Brent Smith noted that inputs need to be worked with national contacts and prepared in a timely manner.

Action	22-17	CEOS Chair to prepare to coordinate a response to the GCOS IP update in the open review period	Expected May-June 2009
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21 Update on Coordination with CGMS and WMO Space

Pontsho Maruping presented an update on CEOS coordination with CGMS and WMO Space:

- In 2007 USGS as CEOS Chair initiated a review of opportunities for closer coordination among CEOS, WMO Space and CGMS, the recommendations of which were presented to 2007 Plenary;
- These recommendations included event information sharing and combination where appropriate; annual meetings among top-level representatives; CEOS representation on the RSSC-CM Executive Panel; and more regular communication and coordination; and
- A side meeting was held ahead of Plenary 22 with CGMS, CEOS and the new head of WMO Space, Barbara Ryan which recognised progress between CEOS and CGMS on issues of GSICS and R/SSC-CM . It was agreed that CEOS and CGMS have different scopes and approaches but shared some similar objectives; improved coordination is desirable in order to build on the respective strengths of each organization.

The incoming CEOS Chair (GISTDA) has agreed to take an action to look at opportunities for improved coordination in 2009 including a small task force with representatives from all three bodies working with the 2007 recommendations as a baseline, and in coordination with the GEO Secretariat.

Barbara Ryan (WMO) gave some historical context and suggested we have both a strategic component to discuss (such as the WMO Vision of GOS) and a tactical component. Barb suggested that WMO wants to come to the table expressing requirements to the space agencies. When CEOS framed the Virtual Constellations WMO was keen to see how these frameworks could contribute to meet the WMO requirements. Barbara suggested that GEO reinforced the need for an integrated system. WMO has a mandate related to weather, climate and water SBAs and supporting observing systems (not just satellite). In particular, as one of the four sponsors of GCOS, WMO would like to see how CEOS agencies can contribute to meet climate observation requirements on a long-term basis. WMO fully supports greater collaboration between GSICS and WGCV.

Stephen Briggs commented that the message is not clear. The message suggests that the GOS replaces the GEOSS and GEO is redundant. Barbara commented that the WMO GOS has been successfully coordinating global observations for several decades and hoped that GEO was looking at the GOS as one of the contributing systems ; the intent is not to replace the GEOSS effort but to better contribute to it through further enhancement and integration of the GOS within the GEOSS. Stephen expressed concern that we are too preoccupied with labelling and grouping efforts which are in the end all by the same agencies. Barbara agreed and stressed the need for the coordinating bodies not to give mixed signals to the implementing staff. Lars Prahm supported the presentation by WMO and stressed the difference in the mandates of CGMS from CEOS. CGMS coordinates the meteorological operational agencies and CEOS coordinates all Earth observation agencies. Furthermore, Lars suggested that CEOS agencies take an action to see how they can contribute to the vision for the GOS expressed by WMO. This latter intervention was also supported by Mary Kicza.

Pontsho proposed that we continue as agreed at the side meeting – allowing the interaction to continue and for GISTDA to lead further discussion on how to improve the coordination. Barb offered to send the latest version of the GOS Vision – with a request for emphasis on space agency contributions to the WMO effort.

Volker Liebig suggested that we stress not what is the global observing system (since we are all in reality contributing) but should concentrate on what everyone can deliver. This should be the emphasis. Tim Stryker concurred with Volker’s recommendation and urged we emphasise on what we can contribute. Stephen Briggs suggested that we should be talking about GEOSS and that GEO should be conducting this discussion.

Action	22-18	GISTDA as CEOS Chair to lead a small task force with representatives from CGMS, WMO SP, CEOS, in coordination with the GEO Secretariat, to look at opportunities for improved coordination among the four organisations. The 2007 recommendations for improved coordination should be taken as a baseline for this activity.	CEOS-23
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22 CEOS Publications & Outreach

Kazuko Misawa presented an update on recent CEOS outreach activities:

- MEXT/JAXA has produced the CEOS Newsletter since 1993, and the 32nd is to be published in February 2009;
- MEXT/JAXA has also produced multiple Brochures for CEOS and IGOS, with the 2008 CEOS Brochure published in October 2008; 7000 copies have been printed with planned distribution at Plenary, GEO Plenary (Bucharest) and through the CEOS Community with the 32nd CEOS Newsletter; and
- JAXA and NASA have worked on the CEOS website since 2001 with NASA responsible for content and JAXA responsible for hosting; the CEOS SEO has developed a new CEOS Home Page which they will be deploying soon; CEOS SIT will have responsibility for updating this new website.

MEXT/JAXA thank the SEO Team for the future efforts in maintaining the new CEOS Home Page.

Tim Stryker (USGS) expressed appreciation for MEXT/JAXA efforts in producing these high quality outreach materials for CEOS. Darasri Dowreang (GISTDA) noted that the EO Handbooks have been shipped to COP-14 and would welcome copies of the new brochure being sent there as well. Kazuko confirmed that JAXA will arrange this in collaboration with GISTDA.

23 CEOS and the Commercial Sector

Mark Churchyard presented a summary of a “Light-Touch” Task Force activities at the International Astronautical Congress (IAC) in Glasgow:

- A CEOS event was held at IAC on the 1st October which looked at the role and contributions of CEOS Working Groups and the CEOS relationship with the Commercial Sector;
- Presenters were Pontsho Maruping (CSIR), Brent Smith and Stan Wilson from NOAA, and David Williams (BNSC); and
- Approximately 30 people attended the event, which raised audience awareness of CEOS and its role; a larger number attended a reception after the event which provided an opportunity for more informal discussion.
- Savi Sachdev asked whether the representation from industry was as expected and Mark expressed some disappointment at the numbers. Brent Smith (NOAA) noted that letters had been received from US and European commercial groups to which CSIR responded as Chair in 2008. He recalled the round table in 2000 chaired by INPE and noted that this issue comes and goes over time

There remains a task to reach out to the commercial sector to forge a closer bond between CEOS and the commercial sector leading to a fruitful relationship for both which the Task Force suggests best be pursued through industry involvement, as appropriate, in CEOS Working Groups. In addition, outreach publications provide an important knowledge exchange mechanism.

Pascale Ulte-Guerard (CNES) noted that some WG members feel uncomfortable about the presence of private companies in the WG meetings – in particular in WGCV. It was agreed after a suggestion from Mary Kicza (SIT Chair) that this would be resolved on a case by case basis within the Working Groups.

Mike Tanner (GEO SEC) thanked BNSC for their efforts. He stressed the value of reaching out to industry.

24 Radio Frequency Coordination Matters

Edoardo Marelli presented a Space Frequency Coordination Group (SFCG) perspective on frequency protection for EO satellites:

- WRC meetings are only held every 4 years and the conclusions are binding at a UN treaty level;
- The SFCG-28 meeting was held in September 2008 (Quebec City) and was attended by 63 delegates from 14 space agencies and 4 observer agencies;
- Some topics discussed included an analysis of the results of WRC-07 vs. SFCG objectives; the first version of the “WRC-11 SFCG Objectives”; and other issues relevant to CEOS;
- SFCG-29 will take place in June 2009 (Moscow);
- WRC-07 outcomes were overall generally satisfactory for the Earth observation community, including: extension of 18GHz for geostationary metsat downlink; sharing in the 10.6 and 36Ghz passive bands; unwanted emission limits to protect purely passive bands at 24 GHz, 31 GHz and 50 GHz; extension of the 9Ghz active sensors allocation; ITU filing regulations were modified to allow proper registration of satellite passive and active RF sensors;
- Regulatory limits were not agreed for the 1.4GHz band important to ocean salinity and soil moisture; but recommended values were agreed in line with the EO community guidance;
- WRC-11 objectives concentrate mostly on the protection of current allocations rather than asking for new ones; several agenda items need to be monitored very carefully; an important item will be the revision of the identification of the passive usage from 275-3000 GHz;
- **CEOS agencies are encouraged to support to their agency’s Frequency Management Office in the definition of scientific sensing needs in these high frequencies (275-3000 GHz). The work in SFCG is already well advanced, with support by IGARSS; and**
- **A new Resolution on the relevance of EO applications will generate an ITU-R Report.**

Some of the topics of interest to CEOS discussed at SFCG:

- **Use of the 8025-8400 MHz band for EO data downlink will become very congested at high latitude stations; space agencies are strongly invited to invest in the technology necessary for a future transfer to 25.5-27GHz;**
- Sharing of the 25.5-27 GHz band between EO and space science missions is under study; and
- **New proposed Short Range Devices (SRD) are proposed at various frequency bands for national regulatory decisions; SFCG sees the potential to affect international services like EO satellites; therefore decisions on SRD should be taken only at international level. Strong lobbying is needed on this subject.**

A number of national spectrum management agencies have been “outsourced” to private companies which charge commercial licence fees and are less sympathetic to “free” spectrum often used by EO satellites. The economic success of spectrum auctions means that spectrum allocation is increasingly being decided on the money that can be raised. This poses a challenge for public sector EO satellite operators, who generally don’t have the budget to compete with private sector organisations in spectrum auctions. Eventually this issue could lead to the loss of services and data through increased interference. CEOS support could be valuable in supporting a lobby on behalf of public sector EO satellite operators – with a particular need to emphasise the economic, social and scientific impact from the loss of Earth observations.

Edoardo confirmed that the SFCG meets annually and has done for 28 years. Chinese and Indian representation needs to be improved. Stephen Briggs stressed the importance of this item to our future success. He highlighted the THz range as promising for future limb-sounding observations. He noted that the economic benefits report by PWC on GMES is an example source for the economic arguments being developed by SFCG. Conrado Varotto (CONAE) congratulated Edoardo on the significance of his presentation, raised the X-band interference issue and noted past problems in this area at ITU.

Action	22-19	CEOS agencies are encouraged to continue to review the SFCG activities in anticipation of issues of relevance to the EO Community and to lobby national administrations as appropriate.	Update at CEOS-23
Action	22-20	CEOS Chair to confer with SFCG to discuss the possibility of a CEOS document quantifying the impact (economic, social, scientific) from loss of Earth observations through pressure on enabling spectrum	CEOS-23

25 Short Agency Reports

ESA

Volker Liebig presented a report from ESA:

- The launch of GOCE is expected in Spring 2009, and the mission is planned to determine the gravity field accuracy within 1 mGal, determining the geoid with a radial accuracy of 1-2 cm;
- Also planned for launch in 2009 are: SMOS, ESA’s soil moisture and ocean salinity missions (likely July 2009); and CryoSat, ESA’s ice mission (November 2009);
- The ESA Ministerial Conference will be held in late November 2008, and three EO elements will be presented: MTG, GMES Segment 2 and the Climate Change Initiative;
- The development of the Sentinel missions and ground segment is currently underway; and
- ESA’s Climate Change Initiative has the objective to systematically generate and distribute long term series of ECVs to meet the needs of UNFCCC and IPCC based on archived ESA data.

Mauro Facchini added that the EC had published a paper last week addressing the future governance of GMES. This was an important step to secure GMES operations.

EUMETSAT

Lars Prahm presented a report from EUMETSAT:

- 6 MTG satellites will provide continuity of Meteosat GEO observations from 2015 with operations envisioned to continue through 2035;
- Instruments in the MTG program will include a flexible combined imager, a hyperspectral infra-red sounder, a lightning imager and a UV sounder;
- Over Europe, MTG will focus on the “fast” component of the hydrological cycle; over the hemisphere it will look at convective/non-convective events, critical weather situations, fires and volcanic ash eruptions, gradients of moisture, wind and temperature, atmospheric gasses and chemistry and lightning strikes;
- EUMETSAT is also involved in operational oceanography with the launch of OSTM/Jason-2 on June 20, 2008; this mission is carried out in conjunction with CNES, NASA and NOAA;
- Jason-2 represents a key component of the OSTM Constellation, and a Jason-3 follow-on is under discussion with NOAA;
- EUMETSAT will also operate the oceanography mission of ESA GMES Sentinel-3 satellites(s); and
- EUMETSAT also undertakes many activities toward the operational monitoring of climate and the detection of global climatic changes.

DLR

Klaus Schmidt presented a report from DLR.

- TerraSAR-X - the world’s first spaceborne radar mission implemented with a public-private partnership scheme - is currently operational and delivering images and data; applications include cartography, agriculture and forestry, environment, risk management and security;
- Following TerraSAR-X, TanDEM-X is planned for launch at the end of 2009 with the main objective to generate a global DEM for geo-scientific research and commercial applications;
- RapidEye - 5 identical satellites in a common orbital plane and a mission to monitor Earth’s surface with daily revisit - was launched in August 2008;
- EnMAP – a hyperspectral imaging mission for monitoring of ecosystem parameters is currently going through Phase C/D kick-off, and is planned for launch at the end of 2012;
- Development of next generation SAR, HRWS, is underway and a demonstration is expected for 2011; and
- 2008 marks the 6th anniversary for SCIAMACHY on ENVISAT.

JAXA

Satoko Miura presented a report from JAXA:

- JAXA has embarked on an Asia-Pacific Earth Observation capacity building project with the objectives of providing necessary technical know-how, applying Japanese satellite data archived over the past 25 years, developing in-house capacities in countries in the region; and identifying future needs in the region;
- Japan has been providing capacity building support to the region since 1995, has reached more than 1200 experts from 27 countries, applying an annual budget of approximately \$US 300,000;
- Starting in 2007, JAXA has opened the door to mini-projects from Sentinel Asia JPT member organizations interested in developing their capabilities; these projects have been conducted with Bangladesh, Bhutan, Cambodia, Indonesia, Lao PDR, Malaysia, Mongolia, Philippines, Sri Lanka, Thailand and Vietnam;
- JAXA has also carried out specialized training in Japan for mini-project high achievers and lecturers; and
- Other activities include an ALOS pilot project with Indonesian LAPAN; organization of the Asian Water Cycle initiative; and Sentinel Asia system operation training.

CSA

Savi Sachdev presented a report from CSA.

- The CSA EO program has three elements: environment, energy and resources and sovereignty and security; and a history of success with RADARSAT-1 and 2, SciSat-1 and contributions to ESA and NASA programs;
- CSA is committed to providing RADARSAT data continuity beyond RADARSAT-2 with a three satellite RADARSAT Constellation Mission (RCM) planned for launch in 2014-2015;
- CSA has provided support to CEOS atmospheric science efforts working with the ACC and the WGCV Atmospheric Chemistry Subgroup; and
- CSA is also leading the GEO Task on "Use of Satellites for Risk Management."

NOAA

Mary Kicza presented a report from NOAA.

- 2008 accomplishments included the launch of Jason-2; restoration of climate sensors on Next Generation Environmental Satellites (NPOESS); acquisition and operations begun for Next Generation Geostationary Satellites; NOAA GEONETCast Americas progress; and the release of the first ever NOAA Satellite Strategic Plan;
- Joint NOAA/EUMETSAT planning for Jason-3 is underway with a proposed 2010 start and a proposed 2013 launch; and
- The Jason series of satellites provides continued valuable global sea level rise data extending the available measurements from 1992 through the present.

GISTDA

Darasri Dowreang presented a report from GISTDA.

- GISTDA has launched the Thailand Earth Observation System (THEOS) – developed by EADS Astrium; the mission has both PAN (2m) and MS (15m) payloads; and
- The first image was acquired on 3rd October 2008 over Thailand.

26 Calendar November 2008 – November 2009

Pakorn Apaphant (GISTDA) presented a summary of activities planned for the next 12 months. Highlights included:

- 23rd CEOS Plenary: 2-4 November 2009, Phuket, Thailand hosted by GISTDA;
- SIT Workshop: 26-28 January 2009, Silver Spring, MD, USA;
- SIT-23: 3-5 March 2009, Florida, USA hosted by NOAA;
- SIT-24: 9-11 September 2009, Darmstadt, Germany hosted at EUMETSAT (this will be a working-level meeting);
- WGISS-27: 11-15 May, CNES/France; and WGISS-28: 28 September – 2 October 2009, CSIR/South Africa;
- WGCV-30: 26-28 May 2009, INPE/São José dos Campos, Brazil;
- WGEdu: 18-20 May 2009, Oslo, Norway; and
- GEO-V: 19-20 November 2008, Bucharest, Romania; and GEO-VI in the week of 16-20 November 2009, USA.

Action	22-21	CEOS Agencies to provide working level representation at SIT-24, 9-11 September 2009 in Darmstadt, Germany	9 September 2009
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27 Future Chairmanship

Darasri Dowreang (GISTDA) confirmed that GISTDA will Chair CEOS in the coming year. Julio Dalge (INPE) confirmed that they will Chair the following year. Eva Oriol (ESA) reported on the conclusion of the candidate for the European Chair cycle in 2011 and invited CDTI to propose. Roberto Trigo (CDTI) confirmed that although a new member, Spain is willing to Chair CEOS in 2011 if the Membership is willing to accept and it was immediately noted that Plenary readily accepted the generous offer of CDTI.

Action	22-22	CDTI to confirm their willingness to serve as CEOS Chair in 2011 by sending a letter to CEOS Chair	CEOS-23
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28 2008 – 2009 CEOS Chair Vision and Goals

Darasri Dowreang presented GISTDA's 2008–2009 goals for their CEOS Chair term. 2009 priorities include:

- Continuity of excellent progress towards GEOSS space segment implementation: pro-active oversight of and coordination with the SIT Chair Team and CEO, WGs and VCs;
- Start-up support for key new tasks: in particular the Forest Carbon Monitoring System (REDD) and the JAXA-led GHG coordination group;
- Improvement of outreach and promotion of results: invest more in promoting achievements and benefits;
- Strengthened coordination amongst CEOS Troika members, CGMS and WMO in coordination with the GEO Secretariat towards convergence on a common implementation plan for the GEOSS space segment and the establishment of a task team to explore opportunities; and
- Further development of the Data Democracy efforts: expand efforts to Asia, focusing on ASEAN, and plans to host a Data Democracy workshop.

Darasri Dowreang invited all to the 23rd CEOS Plenary in Phuket, Thailand on 2-4 November 2009. Pontsho thanked GISTDA, congratulating them on launch of THEOS and thanking them for continuing the data democracy initiative. Pontsho thanked everyone who had supported her and CSIR throughout the year and wished GISTDA all the best for 2009, noting that they are well organised and prepared.

Stephen Briggs proposed that CEOS Plenary recognise the outstanding contribution to CEOS of Chu Ishida over many years. This was supported by several participants and the incoming Chair agreed to write to Chu expressing CEOS appreciation.

Dr. Darasri thanked the CSIR team and Pontsho for their significant contribution in 2008. She noted that remarkable progress has been made towards GEOSS implementation and, as incoming Chair, GISTDA will make best efforts to continue this work. The development of GEOSS will need continuing support of all CEOS groups and agencies.

29 Adjourn

As the new CEOS Chair, Dr. Darasri adjourned the meeting.

List of Participants

Agency	Name
ASI	Alberto Tuozzi
BNSC	Mark Churchyard
CDTI	Jorge Lomba
CNES	Pascale Ulire-Guerard
CONAE	Ana Medico
CONAE	Conrado Varotto
CONAE	Laura Frulla
CSA	Guy Seguin
CSA	Savinder Sachdev
CSIR	Pontsho Maruping
CSIR	Wabile Motswasele
CSIR	Alex Fortescue
CSIR	Asanda Ntisana
CSIR	Daniel Mataspola
CSIR	Terence Van Zyl
CSIR	Lufuno Vhengani
CSIR	Matiou Mabokano
CSIR	Biffy Van Rooyen
CSIR	Johnny Rizos
CSIR	Lee Annamalai
CSIR	Stephen Ward
DLR	Klaus Schmidt
EC	Mauro Facchini
ESA	Simonetta Cheli
ESA	Volker Liebig
ESA	Evangelina Oriol-Pibernat
ESA	Ivan Petiteville
ESA	Stephen Briggs
ESA	Edoardo Marelli
EUMETSAT	Paul Counet
EUMETSAT	Robert Husband
EUMETSAT	Lars Prahm
GISTDA	Darasri Dowreang
GISTDA	Pakorn Apaphant
GISTDA	Kongjak Jaidee
GISTDA	Phuriwaj Ruengnaowaroj
GISTDA	Poonthip Sirikulchayanon
GISTDA	Chaowalit Silapathaong
GISTDA	Kulthida Sungsi
GCOS	Paul Mason
GEOSEC	Michael Tanner
IOCCG	Venetia Stuart
INPE	Julio Dalge
JAXA	Makoto Kajii
JAXA	Satoko Miura
JAXA/RESTEC	Kazuko Misawa
NASA	Christopher Blackerby

Appendix 1 - List of Participants

NASA	L. DeWayne Cecil
NASA	Brian Killough
NOAA	Mary Kicza
NOAA	Kerry Sawyer
NOAA	D. Brent Smith
NOAA	Mitch Goldberg
NRSCC	ChangRong Li
NRSCC	HongBing Niu
NRSCC	Guocheng Zhang
NSAU	Vitaliy Yatsenko
NSC	Per Erik Skrøvseth
USGS	G. Bryan Bailey
USGS	Timothy Stryker
USGS	Bryant Cramer
USGS	Robert Ford
WGCV/ESA	Pascal Lecomte
WGCV/ESA	Marie-Claire Greening
WGEDU/EUMETSAT	Gordon Bridge
WGISS/NASA	Martha Maiden
WGISS/NASA	Michelle Piepgrass
WMO	Barbara Ryan
WMO	Jerome Lafeuille

22nd CEOS Plenary Actions
v0.3

George ✓

No.	Action	Due Date
22-1	CEOS Chair to send letters confirming the invitations to IEEE and GGOS to engage at the Working Group level on issues of common interest	December 2008
22-2	CEOS Chair, in consultation with SIT Chair and CEOS SEC, to develop a short discussion paper proposing an annual cycle of CEOS meetings - reflecting the debate at 22 nd Plenary	December 2008
22-3	CEO to inform CEOS agencies of the login details for the CEOS Information Server	December 2008
22-4	CEOS Chair to arrange a CEOS statement and side event at UNFCCC COP-14	November 2008
22-5	CNES, CONAE, ISRO, NASA, and USGS Principals to respond to the 13 June 2008 LSI Constellation letter requesting data contributions to the regional datasets	December 2008
22-6	CEOS Agencies to respond to the OST Mission Requirements Document when it becomes available in early 2009	March 2009
22-7	CEO (on behalf of CEOS Chair) to deliver a report on progress towards implementation of the GEOSS space segment in 2008 to the GEO-V Plenary in Bucharest	November 2008
22-8	SIT Chair Team, CEOS Chair Team, CEO, and SEO to meet with GEO Secretariat in early December to assess results of GEO and CEOS Plenaries and communicate results to CEOS	14 January 2009
22-9	CEO, CEOS Chair Team, SIT Chair Team, SEO, WG Chairs, Constellation Co-Leads, and CEOS SBA Coordinators to be represented at SIT Workshop, 27-28 January 2009, in Silver Spring, MD	27 January 2009
22-10	CEOS Points of Contact for the new GEO WP Tasks to confirm their willingness to serve (CEO will coordinate)	3 March 2009
22-11	CEOS points of contact for the new GEO WP tasks to confirm their willingness to serve (CEO will coordinate)	December 2008
22-12	CEOS agencies are encouraged to register their available resources as contributions to GEOSS	February 2009
22-13	SIT Chair and SEO to circulate preliminary priorities for gap analyses in 2009 and CEOS agencies to review, comment, and provide additional priorities for consideration	December 2008
22-14	JAXA to report on the status of the new GHG coordination task at SIT-23 (recognising this is a CEOS priority in 2009)	SIT-22

22-15	NSC and CSIRO to organize a Working Group and develop a project plan designed to deliver the demonstration of the Forest Carbon Monitoring System ahead of COP-15 (recognising this as a CEOS priority in 2009)	February 2009
22-16	Letters expressing interest in the WGISS Vice Chair role should be sent to the WGISS Chair by agencies by March 31, 2009	March 2009
22-17	CEOS Chair to prepare to coordinate a response to the GCOS IP update in the open review period	Expected May-June 2009
22-18	GISTDA as CEOS Chair to lead a small task force with representatives from CGMS, WMO SP, CEOS, in coordination with the GEO Secretariat, to look at opportunities for improved coordination between the three organisations. The 2007 recommendations for improved coordination should be taken as a baseline for this activity.	CEOS 23
22-19	CEOS agencies are encouraged to continue to review the SFCG activities in anticipation of issues of relevance to the EO Community and to lobby national administrations as appropriate.	Update at CEOS 23
22-20	CEOS Chair to confer with SFCG to discuss the possibility of a CEOS document quantifying the impact (economic, social, scientific) from loss of Earth observations through pressure on enabling spectrum	CEOS 23
22-21	CEOS Agencies to provide working level representation at SIT-24, 9-11 September 2009 in Darmstadt, Germany	9 September 2009
22-22	CDTI to confirm their willingness to serve as CEOS Chair in 2011 by sending a letter to CEOS Chair	CEOS-23