MINUTES OF THE 23rd CEOS PLENARY MEETING

4th - 5th November 2009
Phuket, Thailand

1 Welcome and Opening Remarks

The Chair, Darasri Dowreang (GISTDA), opened the meeting and welcomed participants to the 23rd CEOS Plenary. The meeting was addressed by Dr. Somchet Thinaphong, Chairman of GISTDA's Executive Board, who added his welcome to Thailand and his good wishes for the meeting.

The participants introduced themselves and the proposed agenda for the meeting was adopted.

2 Organisational and Membership Matters

Darasri Dowreang (GISTDA) noted that last year both the IEEE and GGOS had made membership inquiries to CEOS, and both were encouraged to engage CEOS at the Working Group level. A positive response and engagement has been received from GGOS, and the matter is now considered closed. There are no further Membership issues for 2009.

3 The CEOS MIM Database

Eva Oriol-Pibernat (ESA) presented an overview of the CEOS MIM database, noting that this is the official statement of CEOS members plans, and historically has been maintained in support of the production of the print edition of the Earth Observation Handbook. She noted that the online version of the database has been officially launched at database.eohandbook.com.

In 2009 several collaborators were engaged by the ESA team, including WMO and the CEOS SEO (NASA), and closer collaboration with CGMS is under discussion. Barbara Ryan noted that the outreach to the non-CEOS members of CGMS (meteorological agencies) is a very positive development, and that WMO intends to include links to the CEOS MIM database from their online dossier.

The 2009 update was supported by responses from 30 CEOS agencies. The plan is to repeat this update in 2010, and also to add additional functionality and online services.

23-1	**CEOS agencies asked to support the 2010 update of the CEOS Missions, Instruments and Measurements database**	**CEOS 24**

4 Coordination of Open Actions from 22nd Plenary

Stephen Ward (GISTDA) reviewed status of actions from the 22nd CEOS Plenary.

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	COMPLETE
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	SIT-23 COMPLETE
22-3	CEO to inform CEOS agencies of the login details for the CEOS Information Server	December 2008 COMPLETE
22-4	CEOS Chair to arrange a CEOS statement and side event at UNFCCC COP-14	November 2008 COMPLETE
22-5	CNES, CONAE, ISRO, NASA, and USGS Principals to respond to the 26 October 2008 LSI Constellation letter requesting data contributions to the regional datasets	COMPLETE
22-6	CEOS Agencies to respond to the OST Mission Requirements Document when it becomes available in early 2009	CIRCULATED 13 OCT
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	COMPLETE
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	COMPLETE
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	COMPLETE
22-10	CEOS Principals urged to participate in SIT-23, 3-5 March 2009 in Cocoa Beach, FL	COMPLETE
22-11	CEOS points of contact for the new GEO WP Tasks to confirm their willingness to serve (CEO will coordinate)	COMPLETE
22-12	CEOS agencies are encouraged to register their available resources as contributions to GEOSS	COMPLETE Mike Tanner confirmed that there are 174 components and up to 162 additional services in the registry.
22-13	SIT Chair and SEO to circulate preliminary priorities for	COMPLETE

	gap analyses in 2009 and CEOS agencies to review, comment, and provide additional priorities for consideration	THREADS DISCUSSED AT SIT-23
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)	COMPLETE Report given at SIT-23
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)	COMPLETE
22-16	Letters expressing interest in the WGISS Vice Chair role should be sent to the WGISS Chair by agencies by March 31, 2009	COMPLETE CEOS SEC has circulated letter – note four year commitment required
22-17	CEOS Chair to prepare to coordinate a response to the GCOS IP update in the open review period	REVIEW PERIOD IS NOV 2009 – FEB 2010
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.	COMPLETE MEETING BETWEEN CEOS CHAIR, CGMS SEC, GEOSEC, and WMO SP HEAD in a side meeting at SIT-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.	SFCG 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 CSIR has offered leadership on this issue and has been connected with SFCG Will report to Plenary
22-21	CEOS Agencies to provide working level representation at SIT-24, 9-11 September 2009 in Darmstadt, Germany	COMPLETE
22-22	CDTI to confirm their willingness to serve as CEOS Chair in 2011 by sending a letter to CEOS Chair	COMPLETE Roberto Trigo thanked CEOS on behalf of CDTI, indicating that the necessary resources will be dedicated to make their CEOS Chair term successful.

5 Report from the Chair: Accomplishments and Challenges

Darasri Dowreang (GISTDA) reported on the CEOS Chair accomplishments and challenges for 2009, including continued excellent progress towards the implementation of the GEOSS space segment. Substantial progress towards the targets of the CEOS Implementation Plan (CEOS IP) for Space-based Observations for the GEOSS has been made, and high-level demonstrations of GEOSS Space Segment outcomes are planned in support of the GEO-VI and COP-15 meetings.

Strong start-up support was provided by CEOS to two GEO tasks: Global Monitoring of Greenhouse Gases (GHG) from Space (CL-09-03c), and Forest Carbon Tracking (FCT) from Space (CL-09-03b). Several key decisions were taken at SIT-23, including the Forest Carbon Tracking Communiqué and the formation of the CEOS Carbon Task Force, and much progress has been made since then. Challenges exist, including the need to attract additional resources, coordination with existing initiatives and CEOS activities, and showing results, but it is expected that strong progress will continue in 2010.

Positive steps have been taken to improve coordination between CEOS, CGMS and the WMO Space Programme in support of the implementation of the GEOSS Space Segment. Examples include a recent QA4EO workshop (Antalya, Turkey), collaboration on the CEOS MIM, and the climate coordination meeting held on Tuesday. Effective coordination will be required among research and operational space agencies and WMO to formulate a comprehensive response to the GCOS Implementation Plan update.

The development of the CEOS initiative on Data Democracy for Developing Countries continued with a workshop and survey being completed in 2009, and a number of initiatives underway.

Progress has been made towards the definition of a CEOS publication for use in arenas such as the GEO Plenary and Ministerial; and there has been continued engagement with the UNFCCC on CEOS coordination of the implementation of the Global Climate Observing System (GCOS) space-based observations.

Darasri noted other key 2009 CEOS outcomes: progress on outcomes from the CEOS Virtual Constellations; improvements to the various CEOS information systems, including improvements to the CEOS website, the CEOS mailing system and the CEOS MIM database; and raising the importance of societal impact from loss of Earth observing spectrum and of work of the Space Frequency Coordination Group (SFCG).

She noted that maintaining momentum and securing new resources will be major challenges that need to be addressed by the incoming CEOS Chair, SIT, CEO, and SEO. Securing resources will likely require increased political engagement by CEOS and GEO.

Darasri thanked the CEOS community, Working Group Chairs, SBA Leads, Virtual Constellation Leads, and all members who have contributed in 2009.

6 CEOS Executive Officer Report

Ivan Petiteville (ESA) reported that in 2009 the CEOS Executive Officer (CEO) focused on prioritisation, definition, coordination and monitoring the progress of CEOS contributions to the GEO 2009-2011 Work Plan tasks. A number of inputs were provided to GEO including updates to the GEO WP, the CEOS report to GEO-VI Plenary, serving as the co-chair of the GEO Architecture and Data Committee, participating in the "Initial Operation Capabilities" Task

Force, and participation in the process of aligning the GEO 2009-2011 Work Plan with new GEO Strategic Targets and the GEOSS Monitoring & Evaluation Framework.

The CEO participated in a number of outreach interactions in 2009, including the GCOS IP 2nd SCOPE-CM planning meeting (February 09), the 3rd GEOSS Asian-Pacific Symposium (February 09), JSC-30 (April 09), and GEO FCT related meetings including the CEOS SAR Data Coordination meeting (ESRIN, June 09) and Space Data Coordination (Tsukuba, August 09).

Ivan reported that two updates of the CEOS Implementation Plan have been delivered in 2009: in May, an update of the CEOS IP v3 Part II; and in October, CEOS IP v3.1 Parts II and III, using inputs received from CEOS SBA Teams, Virtual Constellation Teams, Working Groups and from staff of the various CEOS Agencies. He also noted that as CEO he has provided active support to the CEOS Deliverables documentation process.

Ivan noted that the CEO role is complex and time intensive, requiring a lot of effort to coordinate numerous CEOS actions and activities, and with external bodies like WCRP and WMO. He also noted that the number of meetings, and the increasing documentation load were significant challenges.

After two years, it's clear that there is too much work for a single person, and it is necessary to reduce the CEO's role in time consuming secretarial tasks to spend more time on more strategic issues. SEO will help developing an online system for tracing actions/tasks. He also noted that for 2010, the CEO's tasks and responsibilities will need to be clearly defined with the incoming CEOS and SIT Chairs.

A replacement candidate for Ivan will need to be identified as his term ends in November 2010.

23-2	**CEOS Chair and SIT Chair, in consultation with CEOS SEC and CEOS Troika, to poll CEOS agencies to identify candidates for the CEO position from November 2010**	**CEOS 24**

Darasri Dowreang (GISTDA) thanked Ivan for his effort as the CEOS CEO, and thanked ESA for its substantial support of the position. Stephen Briggs noted that ESA will have supported the CEO position for four years by November 2010 (with CNES also providing support to the first CEO, Jean-Louis Fellous).

Darasri also took the opportunity to congratulate ESA on the successful launch of the SMOS mission on Monday, and Stephen Briggs added that the mission's key deployment risk points have passed and nominal operations are now expected to begin.

7 CEOS Systems Engineering Office Report

Brian Killough (NASA) reported on the CEOS SEO functions and accomplishments for 2009. He noted that the CEOS SEO was formed by NASA in April 2007, and has provided both technical and management services for CEOS.

In 2009, the SEO designed an online global systems database of CEOS assets to provide information on CEOS agency contributions to GEO societal benefit areas, to support CEOS Constellations, and to support gap analyses (e.g., CO_2) and strategic planning. This activity included working closely with ESA to coordinate data updates for the CEOS MIM database. A new CEOS website (http://www.ceos.org) including an action tracking tool, updated mailing lists and CEOS and Constellation videos, posters and brochures was also created.

The SEO participated in several Constellation and Working Group meetings, and is currently working several special projects including an Atmospheric Composition gap analysis study with Rutherford Appleton Lab (RAL), and a Climate pilot project focused on climate model uncertainty for decision-making.

In 2010, the SEO plans to extend the capabilities and content of the SEO online systems database and coordinate more closely with ESA's CEOS MIM database, complete the first release of a Google-Map coincident imaging tool (COVE) to support WGCV, complete a Mid-resolution LSI Constellation standards document, and to work with the JAXA SIT team to conduct system requirements and gap analyses for strategic planning. They plan to assist WGEdu with their web portal and the development of EduFlow, implement a new online action tool, and continue progress on a climate decision support project.

He noted that in order to help reducing CEO's workload the SEO is planning to implement an online action tracking system in 2010.

23-3	**SEO to implement on-line CEOS-GEO action tracking tool to help address the administrative burden of this activity**	**January 2010**

8 GEO Report

José Achache (GEO) reported that 2009 has been a very busy and productive year, and thanked CEOS Chair and the CEOS SIT for their strong support to the development of GEOSS. He stressed the key values that underlie the implementation of GEOSS: cross-cutting approaches; inclusiveness across organisations; free and open access; and end-to-end decision support services.

He noted a couple of recent achievements, including the release of the Global ASTER DEM, updates to the Charter on Space and Disasters, and significant data sharing from CBERS and Landsat. Significant progress has been made on strategic initiatives like the development of GEOBON, end-to-end services like those being developed for the Forest Carbon Tracking (FCT) and Greenhouse Gas (GHG) activities, and a growing partnership with IPCC.

GEO's priorities for the future will include agriculture and fisheries, the water cycle, energy and water, coastal management, the 2010 baseline for biodiversity, and the Landsat data rescue initiative. The US Landsat archive is now open to the public but much data stored in other receiving stations is not accessible due to policy and/or technical issues. It is important to address this issue because of the value of the 40-year archive which could be made available.

The GEO-VI Plenary and side-events are taking place 12-20 November in Washington, D.C. with in excess of 500 people expected. GEO-VII and the GEO Ministerial are planned for Beijing, China 3rd-5th November 2010. Darasri Dowreang (GISTDA) noted that CEOS will have a strong presence at GEO-VI, including a booth, and that the CEOS statement at GEO-VI will be made through the new CEOS Chair, INPE.

José closed noting that it has been a great year for GEOSS, and a great year for CEOS contributions to GEOSS - including a number of key launches (eg GOSAT, SMOS, GOES, etc.). He stressed the value of the focused approach CEOS has taken to GEOSS, that a reduced number of priorities is paying off for space agencies, and that this focus should continue in the future. He also noted that with recent successes of Earth observation, now is not the time to change data

policies to a more closed model, but to open them up, releasing data sets to make them more broadly available and useful.

There was a discussion of observations that CEOS may be able to provide in the future, and the examples of the water cycle (SMOS) and precipitation (GPM) were highlighted. The key to success is the integration of observations (space, *in situ*) to create end-to-end processes and products (eg for FCT). The next step would be to apply this approach to global carbon and water.

Prior to the GEO Ministerial, CEOS commitments on GEOSS common infrastructure should be completed, the FCT initiative should be well advanced, progress should be made on GEOBON, and a start should be made on the Global Carbon Initiative. Invitations for the GEO Ministerial will be sent once China's offer to host is accepted by GEO Plenary, likely in December. The direction for the GEO Ministerial should be clear by February 2010, as the attendance list matures and outcomes from COP-15 are absorbed.

9 SIT Report

Mary Kicza (NOAA) provided a summary of SIT objectives and goals for 2009, noting that NOAA is handing over the SIT chair role to JAXA as of the close of 23rd CEOS Plenary. She noted that the SIT objective for 2009 was to demonstrate real progress and provide tangible results in SIT contributions to GEO and GEOSS.

Progress has been made in strengthening CEOS linkages to GEO and GEOSS, the list of actions has become more concise and this should continue to be refined, with the commitments of CEOS agencies to be consistently revisited. Significant progress has also been made in advancing the CEOS Virtual Constellations, including the release of the LSI Portal and the establishment of the Ocean Colour Radiometry and Ocean Surface Vector Winds Constellations.

The LSI Constellation has two new co-chairs: Tom Holm (USGS) replacing Bryan Bailey (USGS-retired), and adding INPE. The OCR Constellation welcomes Mark Dowell (EC-JRC) and Paula Bontempi (NASA), replacing Nick Hoepffner (EC-JRC).

Mary noted a couple of strategic topics that SIT has recently looked at, including the identification of key CEOS Deliverables (including FCT, GHG, and Data Democracy) for GEOSS, G8/G20, and Climate Conventions, and addressing candidate "Thread" topics for observational gaps analysis for key GEOSS data gaps with SIT-23 deciding that the implementation of the thread approach should best be referred to GEO.

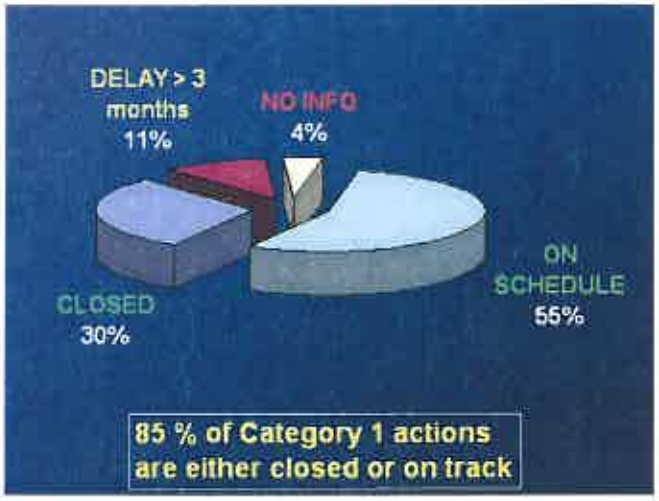
Mary noted the two successful SIT meetings held in 2009 (SIT-23, Cocoa Beach, USA; SIT-24, Darmstadt, Germany), the excellent working relationship that SIT enjoyed with the CEO, and the usefulness of the frequent SIT tag-up meetings. CEOS SIT is a key mechanism within CEOS, facilitating the identification and assuring timely completion of CEOS Deliverables. The CEOS Virtual Constellations are a valuable component of the CEOS portfolio and should be nurtured and moved forward. Examples of topics for new Constellations being discussed include sea-surface temperature, radio occultation, and sea ice.

Mary expressed her appreciation for the relationship with CEOS Chair and thanked the SIT and CEOS Chair teams for their support and guidance in keeping CEOS focused on important objectives.

10 GEOSS Space Segment progress in 2009

Ivan Petiteville (ESA) presented a summary of GEOSS Space Segment progress in 2009, noting that CEOS plays a coordination role as a point of contact for 11 GEO Tasks out of the 16 co-led by CEOS. CEOS provides support to many GEO groups (ie GEO Committees, *ad hoc* groups, GEO Task Teams), and has strong involvement through its Working Groups, Virtual Constellation, SBA teams, the CEOS SEO, and with many resources from CEOS Agencies.

CEOS is engaged in 36 GEO 2009-2011 Work Plan Tasks, out of a total of 115, and is currently working 93 internal GEO-related actions (linked to the 36 GEO Tasks), and 59 "GCOS" actions (CL-06-01c). The efforts of the SIT Chair have been key in securing CEOS Agency resource commitments to support these actions.



Major Virtual Constellation documents have been produced in support of at least 16 actions (OST, ACC), and more than 30 new public datasets generated and registered (FCT, real-time malaria risk map) in the GEOSS Registry in support of at least 15 actions. Approximately 13 Workshops and Training Courses (OCR Constellation) have been organized in support of 8 actions, for example, and at least 8 Web Portals set up or significantly upgraded in support of 8 actions (Solar Shield project, CEOS EO Handbook, CEOS MIM DB).

Progress and momentum from 2008 has been maintained and built upon, and CEOS should better promote its progress and achievements. A consolidation of the CEOS contribution is also possible as the number of CEOS-GEO Actions could be reduced, some actions could be run by a single Agency, and some current CEOS-GEO Actions should be removed from the list.

Mary Kicza (NOAA) thanked Ivan for his effort as the CEOS Executive Officer.

11 2009-2010 Deliverables Document

Mary Kicza (NOAA) reported that the 22nd CEOS Plenary agreed that CEOS focus on Deliverables in 2010 consistent with directions provided by GEO, G8/G20, and UNFCCC. These Deliverables include enabling access to key products and datasets, providing information systems and services to exploit data, providing important new climate data records, and getting commitments to address key gaps or continuity issues.

In 2009, G8 and G20 leaders made declarations reaffirming their commitment to combat climate change, to establish a forest monitoring network, promoting emissions reductions by reducing deforestation, improving water cycle management, improving the sustainable use of natural resources, and improving risk analysis from threats from natural disasters. CEOS has identified a number of Deliverables in reference to these declarations, and will increasingly need to focus on the G20 as the G20 is becoming involved in key climate and environmental matters

In 2009, UNFCCC/SBSTA agreed to a set of Conclusions and a draft Decision for consideration/adoption by Parties at COP-15. SBSTA also responded to the status update provided by CEOS, welcoming the commitment by CEOS agencies to work towards improved availability of current and future data for forest carbon monitoring, and encouraging CEOS to continue, accelerate, development of methodologies, as well as validation and inter-comparison of satellite-based applications for the terrestrial domain.

In their draft decision for COP-15, SBSTA has also requested reports from GCOS, GTOS, and CEOS. In this, they have encouraged CEOS to continue coordinating and supporting the implementation of the satellite component, and urged parties that support space agencies to enable those agencies to continue to implement, the actions identified in the CEOS report, in particular by ensuring long-term continuity of observations and data availability.

Significant progress has been made in the areas of global sea level rise, health, management of energy sources, disaster management, the Global DEM, a GEOSS quality assurance strategy, education, training, and capacity building, information service infrastructure, and the CEOS Mission, Instruments and Measurements Database 2009. The CEOS Deliverables document is a living document, and it is expected that the incoming SIT chair (JAXA) will continue this effort.

Mary added that the 2010 NOAA budget for Jason series continuity has been secured, and confirmation from the EUMETSAT side is keenly awaited.

Darasri Dowreang (GISTDA) noted that the Chair team chose to focus on Deliverables, and thanked SIT for making the CEOS Deliverables document a reality so quickly and efficiently.

12 Data Democracy 2009 Progress

Pakorn Apaphant (GISTDA) presented an update on the progress made by CEOS on Data Democracy in 2009. The approach to date has been to treat it as an end-to-end process, from data access, handling and processing to product generation and application. There were three main focuses for Data Democracy in 2009: holding an Asian Data Democracy Seminar, increasing Asian engagement in Data Democracy, and participating in a GEO call for Proposals Earth Observations in Decision Support.

Specific needs identified by Asian users included flood, drought, forest fire, landslide, earthquake, and volcano related data, as well as analysis software and training.

Strong support has been provided by many CEOS agencies including CSIR, GISTDA, INPE, JAXA, NASA, and USGS, as well as the CEOS Working Groups: WGISS, WGCV, and WGEdu. Good progress has been made on providing free data access for the African Monitoring of Environment for Sustainable Development (AMESD) project, free and open access to CBERS (INPE ground stations), Landsat and NASA instruments. In addition, free data access for disaster management in South East Asia has been promoted through Sentinel Asia.

Capacity building activities were conducted in conjunction with the AMESD Project, South African Development Community (SADC) Universities, GIS training course packaged with open

source software for use at secondary school level in South Africa, training programs (face to face and e-learning) for African end-users of CBERS images, and a plan for a training program in June 2010 for users in South East Asia on Data Access tools and Natural Disaster Management.

GISTDA, on behalf of CEOS, responded to the GEO call for proposals for EO for Decision Support Projects. The full proposal will be submitted in January 2010. A Data Democracy Task is proposed for the current GEO Work Plan, pending approval at the GEO-VI Plenary.

A Data Democracy data access portal is under discussion, with setup expected to start in early 2010. A CEOS Data Democracy Training course for users in SE Asia, Thailand is planned for mid-2010.

Gilberto Câmara (INPE) requested inputs from all CEOS Agencies as to their ideas on the most important Data Democracy efforts to be pursued in 2010.

23-4	**CEOS agencies to provide opinions to INPE as to the most important efforts to be pursued in 2010 in the Data Democracy initiative**	**January 2010**

Stephen Briggs (ESA) noted that the ESA Council recently voted unanimously that the data from the Sentinel series missions should be made available on a free and open basis. This will be made official in 2010 pending confirmation of the EC position; it was noted that ESA/EC expect to promote not just the data availability, but also tools and capacity building.

Mauro Facchini (EC) noted that their decision process requires all services to be consulted, and that issues like security restrictions need to be considered. He stressed that the EC is fully in favour of a free, full and open access to the greatest extent possible. Plenary welcomed the news on the Sentinel data policy.

Wabile Motswasele (CSIR) expressed gratitude to CEOS members for their support of the Data Democracy efforts, initiated during the CSIR term as CEOS Chair. Gilberto confirmed that INPE would continue the Data Democracy effort in 2010.

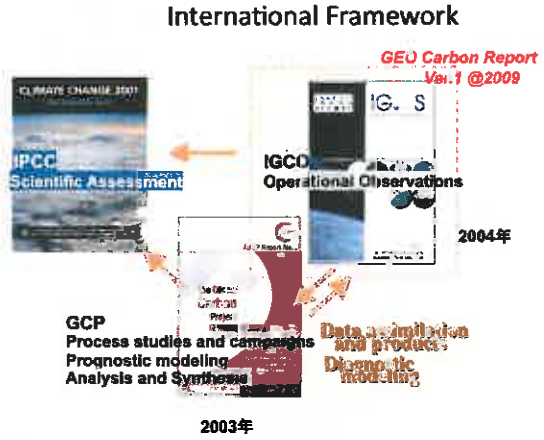
13 GHG and GEO Carbon Report

Osamu Ochiai (JAXA) reported on the activities of the CEOS Carbon Task Force on behalf of Takashi Moriyama. He reported that GOSAT is operating nominally, and reviewed a number of current results (validation is currently underway).

GOSAT Level 1 data was released on 30th October from both the TANSO-CAI and TANSO-FTS instruments. Comparisons are underway with Envisat/SCIAMACHY, Aqua/AIRS, MetOp/IASI, and with data gathered by sensors installed in the cargo bays of JAL aircraft.

At SIT-23, the CEOS Carbon Task Force was proposed by JAXA (SIT action 23-3) aiming to provide coordination amongst CEOS carbon related tasks. The tasks are divided into three subtasks: Integrated Global Carbon Observations, Forest Carbon Tracking, and Global Monitoring of Greenhouse Gases from Space. The first GEO Carbon Task Force meeting was held in May 2009 in Canberra with the leadership of CL-09-03a, b, and c. At this meeting, the GEO Carbon Report update team was formed, integrated inputs to COP-15 were discussed, future inter-agency meetings were planned, and it was agreed to establish the GEO Carbon Community of Practice (CCoP).

The CCoP serves a crucial function in formulating GEO strategy on Carbon issues, discussing the way forward for the carbon observing system, and facilitating communication between those making observations and those developing models of the carbon cycle. The group follows on from the IGOS-P Carbon Theme (IGCO), which started in 1999. One of the group's first key activities is to carry out a collaborative update of the IGCO Theme Report incorporating the latest science and renaming it the GEO Carbon Report. The initial draft of the report was released before SIT-24, and many valuable comments have been received.



It was suggested that recognition of the GEO Carbon Report be included in the CEOS statement at COP-15.

23-5	**CEOS Chair to cooperate with GEOSEC to provide a letter accompanying submission of the GEO Carbon Report to UNFCCC SEC ahead of COP-15; and to ensure copies are available at CEOS & GEO events in Copenhagen**	**End November 2009**

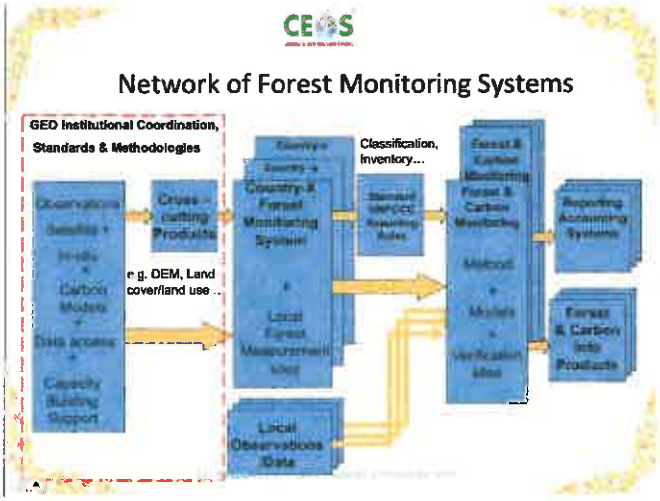
The first face-to-face meeting of the GEO CCoP was held in September 2009, and side meetings are planned for GEO-VI. In addition, there will be a special report to the GEO-VI Plenary on Global Carbon Monitoring Systems. It is planned to release the first draft of the updated GEO Carbon Report at the IGOS Symposium (19th November, after GEO-VI).

Stephen Briggs (ESA) raised the question of the maturity of GOSAT products, and whether they have been validated sufficiently to be presented in the GEO-VI and COP-15 forums. Mike Freilich (NASA) noted that this data is very important and should be exploited as much as possible. He noted that the release of the data would expose it to scientific scrutiny which can be quite productive, but that there is a tension with the political implications of public release. Release to the scientific community is different from making a political statement, though both present certain credibility issues.

Satoko Miura (JAXA) noted that initial validation and calibration is completed before release, and the data will be subject to continuous calibration-validation efforts. Osamu noted that only Level 1 data has been released (spectrum data) and that Level 2 products will not be released until the February 2010 timeframe.

14 Status Report on Forest Carbon Tracking

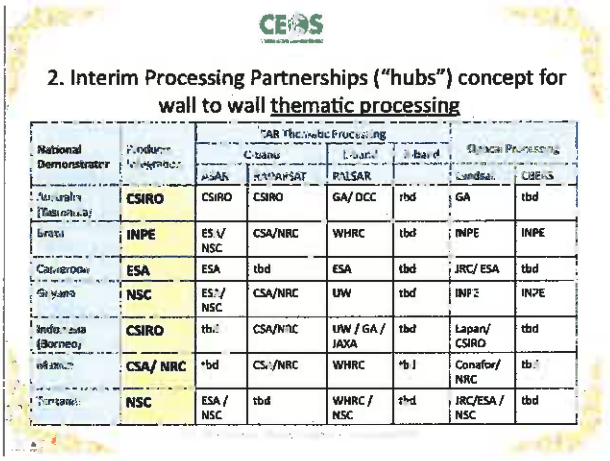
Alex Held (CSIRO) presented a status update on the Forest Carbon Tracking activity. The GEO FCT task is policy driven, and seeks to follow the spatially explicit Approach 3 of the UNFCCC-IPCC Guidelines on Lands and Emissions Methods. The approach is to work towards a network of national systems with GEO providing coordination of observations, tools and methodologies to support the establishment of the network.



The need is for wall-to-wall, border-to-border forest information in order to address issues like "leakage", and this information should be provided on an annual basis at best available operational resolution (say 25m). The creation of time series of data supporting inter-sensor (optical and SAR) interoperability is also important.

The task seeks to consolidate acquisition requirements, demonstration of initial capability, coordinate protocols, data analysis tools and standard methodologies, and the development of 2009 results for a series of National Demonstrators. Progress towards these objectives has been made, with highlights including the CEOS Communiqué, the establishment of the National Demonstrators (NDs), the satellite data requirements document, the 2009 CEOS data acquisitions, and the GEO FCT Portal.

The NDs identified in 2009 are Brazil, Guyana, Mexico, Borneo, Tasmania, Cameroon, and Tanzania. This list may be expanded in 2010 with a number of candidates interested. The FCT Task is working to establish a set of processing hubs to generate 2009 results for each of the NDs.



2. Interim Processing Partnerships ("hubs") concept for wall to wall thematic processing

National Demonstrator	Producer Government	SAR Thematic Processing				Optical Processing	
		Ortains		Ground	Onboard		
		ASAR	RADARSAT	PALSAR		Landsat	CBERS
Australia (Tasmania)	CSIRO	CSIRO	CSIRO	GA/ DCC	tbd	GA	tbd
Brazil	INPE	ESA/ NSC	CSA/NRC	WHRC	tbd	INPE	INPE
Cameroon	ESA	ESA	tbd	ESA	tbd	JRC/ ESA	tbd
Guyana	NSC	ESA/ NSC	CSA/NRC	UW	tbd	INPE	INPE
Indonesia (Borneo)	CSIRO	tbd	CSA/NRC	UW / GA / JAXA	tbd	Lapan/ CSIRO	tbd
Mexico	CSA/ NRC	tbd	CSA/NRC	WHRC	tbd	Conafor/ NRC	tbd
Tanzania	NSC	ESA / NSC	tbd	WHRC / NSC	tbd	JRC/ESA / NSC	tbd

23-6	**CEOS and SIT Chairs to work with the FCT Co-Leads to confirm CEOS agency commitments and timetable for processing and product development for the 2009 GEO Forest Carbon dataset**	**December 2009**

Pascal Ultré-Guérard (CNES) asked how the move to the operational phase would be made, and if the users are sufficiently engaged. Per-Erik Skrovseth (NSC) noted that the presentation tomorrow (item 20) will address the way forward, and that the existing level of governmental engagement was considered in the selection of the NDs.

George Dyke gave a run through of the FCT Portal Demo. Gilberto Câmara (INPE) asked how much progress the Task hopes to make in the short term. Alex noted that the Task seeks to expand on a country by country basis for the time being but that more ambitious expansion will be required at some stage in order to move to operations and to global scale in support of a post-Kyoto treaty.

15 Climate SBA Report

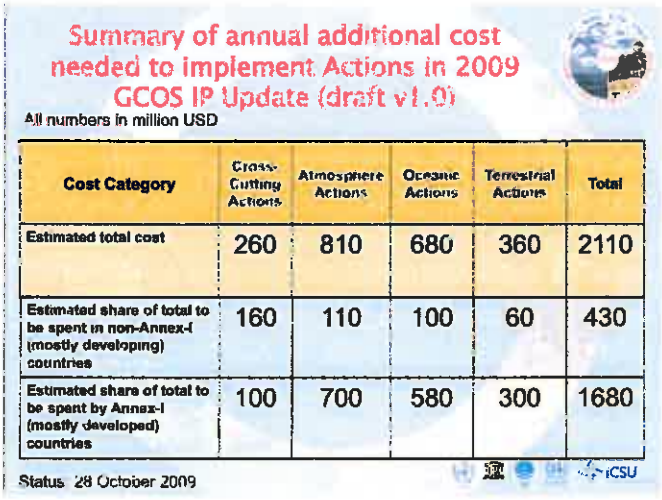
Mitch Goldberg provided an update on activities within the Climate SBA, noting that the GCOS assessment of space agency progress is very favourable, and that space observing systems are progressing better than other classes of observing systems. 17 CEOS-GCOS climate actions have been initiated based on readiness from CEOS to work these actions. Mitch proposed a meeting in January 2010 to review the new GCOS IP and to review and amend the 59 actions CEOS had agreed to undertake in support of GCOS. The new GCOS IP is broken up into key needs and actions.

23-7	**CEOS Climate SBA Coordinator to work with SIT Chair to: coordinate CEOS review of the updated GCOS IP; establish a coordinated CEOS Response to the Updated GCOS IP; and associated progress report to SBSTA of UNFCCC**	**31 January 2010 (review) October 2010 (response and SBSTA report)**

Mitch gave a report from GCOS on behalf of Carolin Richter (Director, GCOS Secretariat). One of the key questions raised by GCOS to CEOS was whether a Satellite Supplement update is needed; this would not happen until late 2010 or 2011.

23-8	**CEOS Climate SBA Coordinator to work with SIT Chair to respond to GCOS on the issue of the need for an update of the GCOS Satellite Supplement in 2010**	**April 2010**

The GCOS IP update has an open review from 15 November 2009 to 31st January 2010, and covers ECVs, satellite needs, and cost estimates. GCOS has costed their Implementation Plan at around $US 2.1Bn annually.



Summary of annual additional cost needed to implement Actions in 2009 GCOS IP Update (draft v1.0)

All numbers in million USD

Cost Category	Cross-Cutting Actions	Atmosphere Actions	Ocean Actions	Terrestrial Actions	Total
Estimated total cost	260	810	680	360	2110
Estimated share of total to be spent in non-Annex-I (mostly developing) countries	160	110	100	60	430
Estimated share of total to be spent by Annex-I (mostly developed) countries	100	700	580	300	1680

Status 28 October 2009

A number of areas for GCOS-CEOS collaboration have been flagged, and it was also noted that GCOS is a "CEOS Associate" and that GCOS is committed to continue the successful partnership with CEOS.

Stephen Briggs stressed the importance of the relationship with GCOS and the need for CEOS to support GCOS. GCOS is not present at Plenary and was almost not present at SIT-24. He proposed that the CEOS Chair write to WMO indicating the value of the independent expert role of GCOS, the importance which CEOS places on its relationship with GCOS, and encouraging GCOS representation at future CEOS meetings. Barbara Ryan (WMO) agreed that if CEOS desired, this communication would be appropriate.

23-9	**CEOS Chair to write to WMO (cc GCOS) indicating the value of the independent expert role of GCOS, the importance which CEOS places on its relationship with GCOS, and encouraging GCOS representation at future CEOS SIT and Plenary meetings**	**December 2009**

16 Virtual Constellations: 2009 Progress on Implementation Targets

Atmospheric Composition Virtual Constellation (ACC) presented by Brian Killough (NASA).

The ACC has established four projects engaging CEOS members and multiple satellites, and supporting a number of GEO tasks, including Air Quality (NOAA/Eumetsat/NASA, HE-09-03a_3), Smoke and Dust Forecasts (NOAA/NASA, HE-09-01_2), Volcanic Alerts (ESA/NOAA/NASA, DI-09-02a_2), and conducted a requirements and gap analysis (AR-09-02a_14).

Two ACC workshops have been held, with a number of recommendations generated. The Climate-Chemistry Workshop was held 15-17 October 2008, and recommended that NOAA restore OMPS Limb Sensor on NPOESS, that CSA and NASA re-fly SciSat with SAGE-III, and that ESA and BELSPO approve PREMIER (ESA) and ALTIUS (BELSPO, Belgium). The Air Quality Workshop held 15-17 June 2009 recommended that KARI, ESA, NASA and JAXA coordinate future air quality missions, that ESA and NASA fly GACM (NASA) and PREMIER (ESA) to compliment existing data, that ESA add limb capabilities to Sentinel 5, and that NOAA operate NPOESS CrIS to enable measurements of CO.

Two CEOS actions in support of the ACC have been proposed.

(1) CEOS Agencies with interest and assets in atmospheric composition, should investigate missions to fill the data gap in atmospheric composition in the UT/LS and stratosphere after the end of the Aura, Envisat, and SciSAT-1 mission lifetimes.

(2) CEOS agencies planning GEO atmospheric composition measurements (Europe, NASA, KARI, JAXA) should develop a plan to coordinate their missions that will result in a GEO constellation with the intent that these missions have at least a 1-year overlap.

Mary noted that these two items have been captured as SIT actions.

Precipitation Virtual Constellation (PC) presented by Osamu Ochiai (JAXA).

NASA has supplied GPM Ground Validation Network (Version 1) software to several institutes for evaluation and use. CNES has confirmed the use of ground stations at Kourou (French Guyana) and Hartebeestoeck (South Africa) for the Megha-Tropiques (M-T) mission enabling near real time data release. CNES/ISRO have confirmed interest in Megha-Tropiques/GPM cooperation; EUMETSAT has confirmed interest in GPM cooperation; INPE/CNES have initiated a joint GPM-Br Phase 0 study; and NASA and JAXA signed a GPM Implementation MOU.

A number of PC meetings and workshops were held in 2009 by JAXA, ISRO, CNES, NASA, and others.

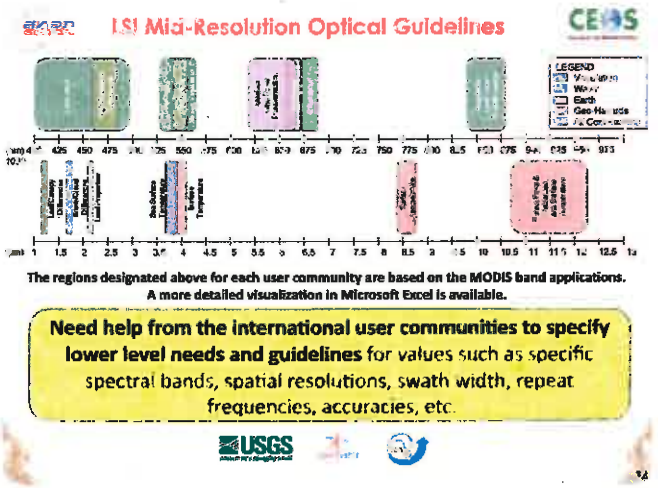
The following requests for CEOS support have been made by the Precipitation Constellation.

- NRSCC/NSMC to identify a PC POC and make available to the PC radiometer data from the recently launched FY-3 MWRI and MWHS imager and sounders (SIT action 22-8);
- ROSHYDROMET to identify a PC POC and make available to the PC radiometric data from the MTVZA sounder/imagers (SIT action 22-7); and
- PC continues to invite NRSCC/NSMC and ROSHYDROMET to meetings/workshops.

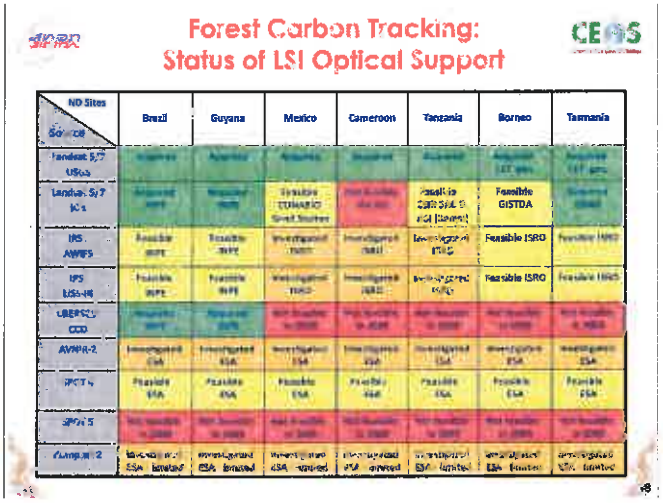
Land Surface Imaging Virtual Constellation (LSI) presented by Tim Stryker (USGS).

The LSI Constellation Portal was launched this year with the aim of providing information and enhanced data access, and is available online at http://wgiss.ceos.org/lsip. Activities and future plans include enhancements to the LSI Portal including direct links to the Forest Carbon Tracking Portal. INPE has provided a web service and freeware software applications to support image

format conversion (www.dgi.inpe.br/CDSR) and ortho-rectification (www.dpi.inpe.br/spring). LSI hopes to formalise a Working Group on Radar (WGR) and develop a LSI Mid-Resolution Optical Guidelines Document.



LSI is currently working to assemble initial data sets for Global Land Survey (GLS) 2010, and is currently evaluating combining data requirements with the GEO Forest Carbon Tracking task.

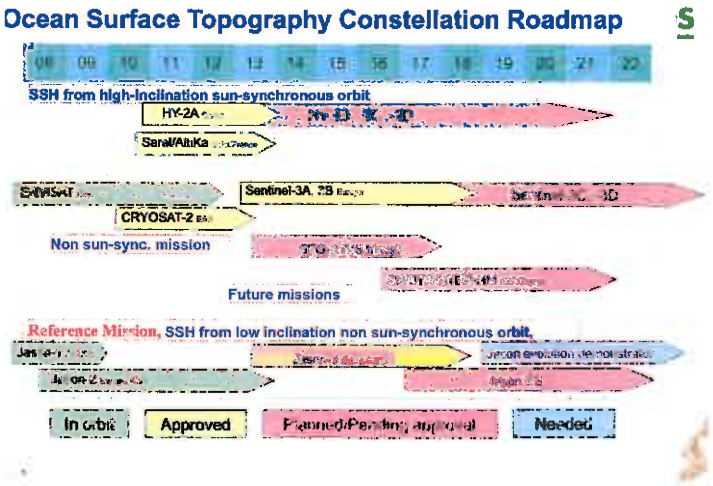


Stephen Ward thanked Tom Holm and LSI for their strong support to the FCT task, and Tim noted the efforts of Bryan Bailey (USGS-retired) in establishing the LSI Constellation.

Ocean Surface Topography (OST) presented by Paul Counet (EUMETSAT).

The following OST missions are under the OST VC umbrella:

- Altimeter missions in orbit: Jason 1 and Jason 2 (OSTM), and Envisat;
- Missions in development: CryoSat-2, SARAL, Sentinel-3A and -3B, and HY-3A; and
- Missions in planning: Jason-3 (NOAA funding approved, EUMETSAT funding expected by the end of the year), Jason-CS (Continuity of Service), GFO-2, and on-going studies for new altimeter concepts by CNES, NASA, ESA.



Copies of the report, *The Next 15 Years in Satellite Altimetry*, recently published by EUMETSAT and NOAA, were distributed to Plenary participants. The report is a high-level requirements document to guide future programme planning for operational oceanography.

The two items of support requested of CEOS members by the OST Constellation are:

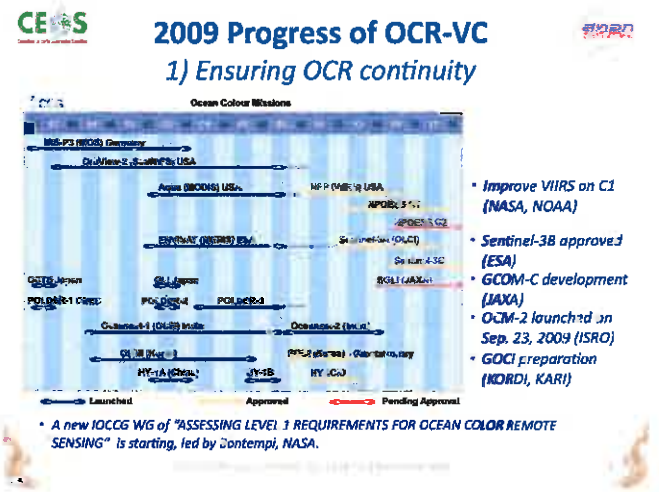
(1) Continued support to secure funding for Jason-3 in time to provide continuity of the Jason-quality data stream, in addition to recurrent units for high-inclination Sentinel-3 mission; and

(2) Engage key officials of the Chinese State Oceanic Administration to collaborate in altimetry - to extend data availability beyond that available from the existing OST Constellation.

23-10	**On behalf of OST Constellation, CEOS Chair to raise issue of HY-2 availability with SOA/China in support of OST Constellation objectives**	**January 2010**

Ocean Colour Radiometry Virtual Constellation (OCR) presented by Hiroshi Murakami (JAXA).

Five OCR implementation targets have been identified: OCR continuity, data quality, data harmonization, user interface, and capacity building (CB-09-03b).



Mark Dowell (EC-JRC) noted that the OCR Implementation Plan will be reviewed at an upcoming meeting, and the discussion will include future focuses and objectives of the Constellation. These objectives include ensuring continuity of observations; providing high quality data sets; data harmonisation and ECV support; facilitating data access; and capacity building and outreach.

Ocean Surface Vector Winds Virtual Constellation (OSVW) presented by Paul Counet (EUMETSAT).

The OSVW Constellation started engaging the user community at SIT-23, focusing initially on operational marine forecasting for Southern Hemisphere via provision of SVW and surface wave heights (SWH) data and assessing whether GMDSS high-seas forecast centres have timely access to, and a capability to use these products.

This year the OSVW Constellation has focused on facilitating data access, and offering training and capacity building. A single point of access for products has been established, and a policy for timely data has been discussed and progress has been made in this direction. Discussions with ISRO on access to Oceansat-2 data are underway.

A series of initial workshops are being planned to plan the direction for the OSVW Constellation. These workshops should include an operational forecaster, and where possible a research user of SVW and SWH from each participating country. The first workshop will be held December 14-19, 2009 in Oostende, Belgium.

At the conclusion of the Virtual Constellations reports, Darasri Dowreang (GISTDA) noted that the final OCR and OSVW Implementation Plans were forwarded on October 29, 2009 along with a request for formal approval at CEOS Plenary. Darasri noted that in accordance with the *CEOS Constellations for GEO Process Paper*, the SIT is responsible, under the authority of the CEOS Chair, for approving the Implementation Plans. Darasri proposed formal CEOS approval of the OCR and OSVW Constellations at Plenary. There were no dissenting votes captured so the OCR and OSVW Implementation Plans were approved.

17 Working Groups: 2009 Report and Actions

WGISS presented by Martha Maiden (NASA).

Martha summarised the WGISS structure, noting that it has been re-organised around a technology-to-application model over her two year term as WGISS Chair. She noted that Pakorn Apaphant (GISTDA) will be taking over as WGISS Chair after this Plenary meeting, and the new WGISS Vice Chair will be Satoko Miura (JAXA). WGISS remains focused on supporting the CEOS role for implementation of the GEOSS space segment.

In 2009, WGISS actively supported a number of GEO tasks including AR-09-02a (LSI Portal), AR-09-02a (AC Portal capability), AR-09-02C (Sensor Web demo), CL-06-02_14 (Climate Diagnostic Portal, http://idn.ceos.org/CD), DA-09-01a (QA4EO for LSI data), DA-09-02a, DI-06-09, and AR-09-01b (Support for Disaster and Health Projects), DA-09-03d (Global DEM), DA-09-01b and DA-09-02a, and HE-09-01 (3 candidate health applications).

WGISS is also looking at issues like network security as it applies to data sharing and interoperability, sensor webs, data quality, a CEOS WGISS Integrated Catalogue, information models and search strategies, and flood monitoring using GRID and sensor web technologies.

Martha requested CEOS endorsement of the WGISS Five Year Plan, which was distributed ahead of CEOS Plenary for review. Darasri Dowreang (GISTDA) asked for comments on the WGISS Five Year Plan, and it was formally endorsed by Plenary.

The following CEOS agency commitments are requested by WGISS:

- Atmospheric composition expertise from agency delegations;
- ESA representation in WGISS; and
- Collaborating agencies for new CEOP "Coordinated Energy and Water Cycle Observations Project".

Darasri thanked Martha for her hard work as WGISS Chair, and Martha noted that she will remained engaged in WGISS and looks forward to working with the incoming Chair.

WGEdu presented by Gordon Bridge (EUMETSAT).

The WGEdu priorities and deliverables include close coordination with CEOS Chair, SIT, WGISS, WGCV, and members on education, training and capacity building issues; support to GEO CB tasks; support QA4EO outreach; support to Constellations; and provide general support to CEOS Outreach Strategy.

WGEdu activities for 2009 included the annual meeting, hosted by NSC in May 2009; initial planning for an Eduflow training module; significant enhancements to the WGEdu Portal; a remote sensing workshop, hosted by GISTDA, in February 2009; and, contributions to CEOS data exchange principles.

Gordon addressed the future leadership of WGEdu, noting that three Co-Chairs were elected at the annual meeting in May 2009: Birgit Stromsholm (NSC), Tania Maria Sausen (INPE), and George Jungbluth (NOAA). The point of contact for CEOS Chair and SIT will be George Jungbluth. The next annual meeting will be held in Argentina, in May 2010, hosted by CONAE.

Gordon outlined the planned deliverables for 2010 including a Latin American disaster management remote sensing workshop in Brazil in February 2010, further upgrades to the WGEdu Portal, development of the GEONETCast Training Channel concept, to produce one "Eduflow" training module addressing ocean/coastal ecosystem issues and, improve links with the GEO CBC.

Darasri thanked Gordon for his hard work and accomplishments as the WGEdu Chair over the past two years.

WGCV presented by Pascal Lecomte (ESA).

In 2009, WGCV actively supported a number of GEO tasks including DA-09-01a_6 (Cal/Val Campaign), DA-09-01a_7 (DOME C Experiment), DA-09-01a_8 (Cal/Val & Post-launch Test Sites), DA-09-01a_9 (Radiometric Standards), DA-09-01a_10 (QA4EO), DA-09-01a_11 (Reference Test Site Data Collaboration & Comparison), DA-09-01b_1 (Land Product Harmonisation), and DA-09-03d_3 and DA-09-03d_4 (Global DEM).

Pascal noted that the Task DA-09-01a_5 remains open due to the lack of support from the CEOS Agencies, and asked for CEOS support in this regard.

Pascal outlined some of the future plans for QA4EO, including: establishment of a high-level task teams with representatives from all SBAs; produce a one-page summary describing the key principle of QA4EO; prepare a high-level implementation and action plan; and, produce a QA4EO 'communication toolbox' including presentations, posters, and brochures.

Pascal presented eight calibration-validation recommendations for CEOS, and encouraged CEOS members to consider them within their agencies.

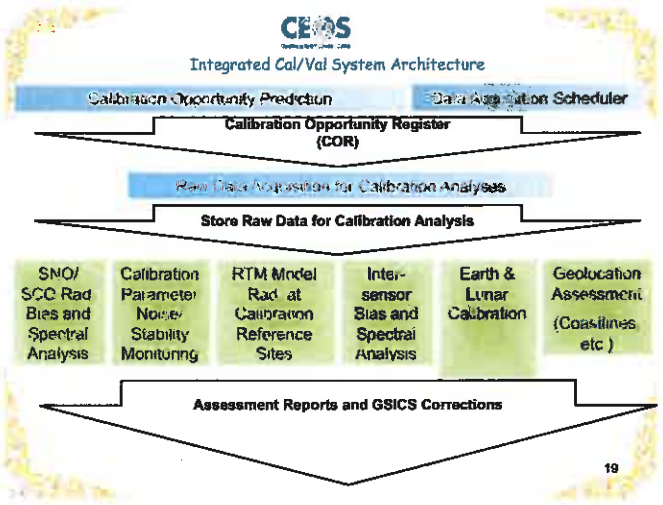
Pascal reported that WGCV will meet in March 2010, hosted by NIST in Washington, D.C., and in September 2010, jointly with WGISS and hosted by CSA.

Pascal noted that to date there have been no proposals to serve as the next WGCV Chair.

Action	**23-11**	**Agencies interested in providing the next WGCV Chair term should forward nominations to WGCV Chair**	**SIT-25**

18 CEOS-GSICS Coordination

Mitch Goldberg (NOAA) reported on the activities of GSICS (Global Space-based Inter-Calibration System); the goal is to enhance calibration and validation of satellite observations and to inter-calibrate critical components of the global observing system. It is part of the WMO Space Programme, and the Implementation Plan was endorsed at CGMS 34 in November 2006. The motivation for GSICS is to ensure well calibrated and inter-calibrated measurements, for example in support of Climate Data Records.



Mitch noted that the first GSICS User Workshop was held 22nd September 2009 in conjunction with the EUMETSAT Satellite Conference in Bath, UK. There were over 60 participants including ECMWF, UKMO, JCSDA, CM-SAF, DWD, RMIB, KNMI, Hadley Centre, ISCCP, and very positive feedback was received.

19 Update on CEOS-CGMS-WMO SP activities

Barbara Ryan (WMO) noted that the following action was given at the 22nd CEOS Plenary.

> *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 organizations. The 2007 recommendations for improved coordination should be taken as a baseline for the activity. (Due date: CEOS 23rd Plenary)*

Barbara noted that the CEOS SIT-23 report recognized that the 2007 recommendations were being fulfilled, that there are areas for specific collaboration including QA4EO, CEOS Database and its links to the WMO Dossier, and that there is no need for an ongoing task force. She also noted that since CEOS SIT-23, collaboration between WGCV and GSICS, and collaboration between the CEOS Database and the WMO Dossier has been significant. She noted that Eva Oriol's report on the collaboration between CGMS and the CEOS MIM is a very positive step in the right direction.

20 Forest Carbon Tracking Outcomes in 2010

Per-Erik Skrovseth (NSC) presented a summary of the GEO FCT needs from space agencies in 2010 noting that the 2009 CEOS response has been very impressive. In addition to the national coverage, increased coverage of verification sites in 2010 will be required, and progress to build longer time series with accessible and searchable archives. He noted that one of challenges with the verification sites in 2009 was that many were not defined until October. V1.0 of the 2010 FCT Data Requirements document is expected in December 2009, and will be updated after an FCT data meeting planned for April 2010 at Woods Hole.

23-12	**GEO FCT Co-Leads to provide CEOS with the 2010 Data Requirements document and CEOS agencies encouraged to respond to meet the satellite data requirements therein**	**December 2009**

Per-Erik also noted that CEOS Agencies will need to clarify their data access policies in 2010 – which data will be made freely and openly available, which data will be restricted commercially, which data will be made available at a cost, and what the cost will be. He also noted that another major priority for 2010 for FCT will be an institutional framework to support the FCT activities.

Mary Kicza (NOAA) raised the issue of resources and priorities for 2010, whether the current plan of meetings and side meetings is sufficient, and how CEOS SIT can support these efforts. Makoto Kajii (JAXA) confirmed that under JAXA Chairmanship, SIT would continue to promote the FCT activity as the top priority for the next two years. It was noted that Norway, Australia, and the GEO SEC are all committing significant resources to the FCT effort, and this is expected to continue in 2010.

John Latham (FAO) noted that in order to be successful, the various forest efforts such as REDD, GEO FCT etc need to be better coordinated, and that FAO remains open and willing to help develop this collaboration.

Pascal Lecomte (ESA) noted that a common calibration methodology should be developed across the various verification sites in order to ensure consistency. Per-Erik noted that the work, and *in situ* measurements at each verification site, are formulated by national bodies, but that there could be a role for WGCV to help develop a protocol on the data verification and calibration.

23-13	**WGCV Chair to work with GEO FCT Co-Leads to identify the supporting role for WGCV in the calibration and validation aspects of the FCT initiative**	**April 2010**

Tim Stryker (USGS) noted that USGS remains willing to continue to support the data acquisitions for GEO FCT. Per-Erik noted that the support from Tom Holm and the LSI Constellation has been very valuable, and it is hoped this will continue – however he did note that the Landsat missions are near their end of life, and so redundancy needs to be considered.

Makoto Kajii asked who the final users of the data are and how have their data requirements been defined. Alex Held noted that there is an FCT product definition currently under development – this document is driven by UNFCCC and post-Kyoto protocol climate policy/treaty requirements. He also noted that each National Demonstrator country may have its own specific data requirements that need to be accommodated.

The question of additional National Demonstrator countries was raised, and there are a number that are currently interested in joining the GEO FCT efforts. However this needs to be balanced with the ability of the CEOS Agencies to respond and provide data within their limitations. Makoto Kajii asked that the GEO FCT Task provide some additional visibility regarding the FCT data requirements for 2010.

Gilberto Câmara (INPE) noted that what FCT is not demonstrating tropical forest monitoring from space; this has already been demonstrated in Brazil and elsewhere; rather the FCT is assessing what it takes to deploy a system globally. Stephen Ward agreed, adding that the FCT Task is trying to build the institutional and technical capacities and technical capabilities to allow these observations to be made on a globally repeatable basis.

Ivan Petiteville (ESA) noted that some agencies are constrained by commercial arrangements (i.e. CSA/MDA, JAXA) and so the GEO FCT Task will need to include accommodation for potential expense for data acquisition. He also noted that the 2009 acquisitions currently sit in the space agency archives, and that the next steps towards processing need to be clarified.

21 Greenhouse Gases Task Force Outcomes in 2010

Osamu Ochiai (JAXA) presented a summary of the 2009 the CEOS Carbon Task Force accomplishments on behalf of Takashi Moriyama (JAXA):

- Supported the establishment of the GEO Carbon Community of Practice and the development of GEO Carbon Report;
- Initiated the development of the combined and compared products for GOSAT and other relevant instruments (ESA/Sciamachy, METOP/IASI, Aqua/AIRS); and
- Develop the prototype of GEO Carbon Portal.

In 2010 the Task Force will work to achieve the following.

- Clarification of the relationship between the CEOS Carbon Task Force and the CEOS ACC Constellation, for example perhaps an ACC-sponsored Carbon from Space Workshop in 2010;
- Further develop the combined GOSAT products and Gap Analysis;
- Support the activities of GEO Carbon Community of Practice;
- Coordinate the CEOS Response to the GEO Carbon Report;
- Ensure the CEOS Carbon Task Force is aware of the relevant impacts of the CEOS response to the GCOS Implementation Plan update; and
- Formulate deliverables for 2010 GEO Ministerial Summit.

Brent Smith (NOAA) emphasized the importance of the Deliverables for the 2010 GEO Ministerial Summit, and that there will be a significant interest in space-based observations of the carbon cycle.

Rich Eckman (NASA) confirmed that Ernie Hilsenrath and Claus Zehner have been discussing how best to accommodate the Carbon Task Force activities within the ACC if required.

Pakorn Apaphant (GISTDA) raised the issue of involving the CEOS SEO in the GHG mission gap analysis. Osamu noted that the SEO has already conducted an initial analysis, which will be useful, and Brian Killough (NASA) confirmed that SEO involvement would be possible.

Gilberto Câmara (INPE) stressed that as the incoming CEOS Chair, INPE will strongly support the efforts of the CEOS Carbon Task Force, and will work with the Task Force to ensure quality Deliverables for the 2010 GEO Ministerial.

23-14	**JAXA to confer with CEOS SEC on the way forward organisationally (esp. in relation to the ACC) for the activities currently promoted by the Carbon Task Force – including definition of Deliverables for the GEO Ministerial**	**April 2010**

22 Space Agency Coordination for Climate

Stephen Briggs (ESA) reported on the outcome of the side meeting on Climate held on Tuesday afternoon. The motivations for this meeting were: to look at raising the profile of space and space agencies in climate; a look at what's needed to analyze ECV-by-ECV production of climate data for GCOS; to consider how to respond to new GCOS reports; consider how to improve positioning of CEOS with respect to IPCC and UNFCCC; and a strategic look at how CEOS can fulfil its responsibility as, "*coordinator of the implementation of satellite components of GCOS.*".

The meeting on Tuesday was well attended (~30 people), and the main discussion points were:

- Space is critical for climate, but resources are needed to support the efforts, and to secure those resources, there is a need to convince politicians of the importance of space;
- CEOS needs to produce an ECV-by-ECV plan identifying the required data sets, determining which ones exist and defining how to acquire those that do not exist, define how to relate those data sets to the required products, and define what CEOS resources are involved (WGs, VCs, etc.);
- A CEOS response to the updated GCOS Implementation Plan needs to be formulated.

During the meeting, Stephen proposed the formulation of an *ad hoc* group within CEOS to study the way forward in Climate.

Mary Kicza (NOAA) agreed with the formulation of the way forward presented by Stephen Briggs. Lars Prahm (EUMETSAT) agreed that more needs to be done on climate, noting that during the side-meeting Mary proposed that a small group be formed to come back at SIT-25 with a proposal.

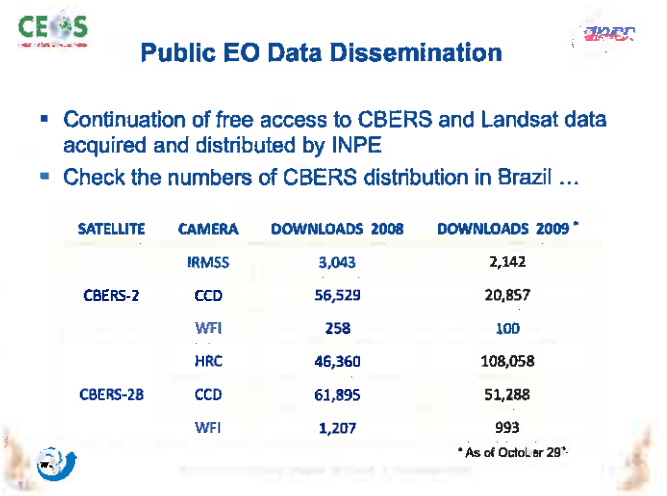
Barbara Ryan (WMO) noted the appreciation of GCOS for CEOS efforts to date and that the proposals from the side meeting are consistent with the needs of GCOS. She noted that GCOS would likely be willing to play an advisory role in the process.

José Achache (GEOSEC) noted that climate and GCOS are not synonymous and that CEOS efforts need to be broader than GCOS alone. Lars referred to the WCC-3 outcomes and to the GFCS initiative of UN agencies. He noted that CGMS plans to write to WMO to ask that space agency contributions are reflected in GFCS planning. Darasri Dowreang (GISTDA) asked Stephen Briggs to set up a small team (to include GCOS, WMO, CEOS Climate SBA Coordinator) to address issues and report to SIT-25.

23-15	**ESA, in consultation with CEOS Chair and SIT Chair, to set up a small team (including the Climate SBA Coordinator) to develop a coordinated approach to improve the management of climate-related activities within CEOS, reflecting the content of discussion at CEOS Plenary 23 - including mechanisms for an ECV-by-ECV analysis of progress by CEOS. A proposal for the way forward should be circulated in time for discussion at SIT-25.**	**SIT-25**

23 Data Democracy Anticipated Outcomes in 2010

Julio Dalge (INPE) presented anticipated Data Democracy outcomes for 2010, noting some key past milestones.



Public EO Data Dissemination

- Continuation of free access to CBERS and Landsat data acquired and distributed by INPE
- Check the numbers of CBERS distribution in Brazil ...

SATELLITE	CAMERA	DOWNLOADS 2008	DOWNLOADS 2009 *
	IRMSS	3,043	2,142
CBERS-2	CCD	56,529	20,857
	WFI	258	100
	HRC	46,360	108,058
CBERS-2B	CCD	61,895	51,288
	WFI	1,207	993

* As of October 29th

Julio highlighted a number of accomplishments including the CBERS for Africa initiative and Sentinel Asia support to disaster management. A number of free and open-source software packages are under development, and a Data Democracy portal is under discussion to help facilitate access to these services. INPE will also focus on training in GIS and remote sensing, developing materials and implementing programs, including activities related to forest monitoring which have been implemented in Brazil for a long time.

Wabile Motswasele (CSIR) expressed CSIR's appreciation to GISTDA and INPE for continuing the Data Democracy initiative, given that it was clearly too large to be completed during the CSIR Chair's term.

Tim Stryker (USGS) noted strong support from USGS on this initiative, and also noted that it is a broadly applicable idea, both in developing and developed countries. Pascal Lecomte (ESA) noted that while Data Democracy was removed from QA4EO, there are a number of points that are quite relevant to quality assurance that can and should be taken into account.

Barbara Ryan (WMO) noted the importance of the idea of being committed to the idea that data being widely used is much more important than data being only archived, which raises a number of political barriers that need to be overcome.

Lars Prahm (EUMETSAT) offered continued use of GEONETCast as well as training on use of the data. This was welcomed and supported by Gilberto Câmara (INPE) as incoming CEOS Chair. Mike Tanner (GEO Secretariat) strongly suggested that the ideas expressed at CEOS Plenary be captured in the formulation of the new GEO Data Democracy Task.

Martha Maiden (NASA) suggested that the CEOS Data Democracy initiative could be seen as providing key support of the GEO Data Sharing activity in the coming year.

José Achache (GEOSEC) repeated his call that open access to data is crucial to the realisation of the GEOSS objectives. He cautioned against mixing the Data Democracy effort with the Data Sharing Task Force which has more financial and political elements – compared to the bottom-up capacity building effort within Data Democracy.

24 Radio Frequency Coordination Matters in 2010

Eva Oriol-Pibernat (ESA) presented on behalf of Edoardo Marelli (ESA) on Space Frequency Coordination Group (SFCG) activities. SFCG has reviewed the "WRC-12 SFCG Objectives", which included the following relevant actions.

- AI 1.25: New Mobile Satellite Service allocations in the range 4-16 GHz;
- AI 1.2: Possible merging of fixed and mobile service definition; and
- AI 1.5: Worldwide harmonization of spectrum for Electronic News Gathering (ENG).

Other relevant subjects of interest for CEOS include use of the 8025-8400 MHz band for EO data downlink, and Short Range Devices (SRD).

Asanda Ntisana (CSIR) outlined two actions that can be taken by CEOS Agencies in support of SFCG.

- Action 1: Use the WRC-12 SFCG Objectives (in Document 1) to lobby spectrum user meetings in their countries by submitting the document to any relevant national or international forum attended by CEOS Delegates; and
- Action 2: Propose, in a coordinated manner, additions/modifications to the draft ITU-R Report on the Essential role of EO Applications (Document 2; copies can be made available). Deadline May 2010.

23-16	**CSIR to work with SFCG, supported by CEOS SEC, to prepare the document on socio-economic benefits of Earth observations**	**May 2010**

23-17	**ESA to circulate the WRC document to establish whether it might serve as the foundation for an official CEOS statement on frequency requirements (to be coordinated by CEOS SEC). CEOS Agencies encouraged to respond.**	**January 2010**

23-18	**CEOS Agencies to use the "WRC-12 SFCG Objectives" document when attending radio frequency related meetings with their national administrations, and to submit it to any relevant national or international forum.**	**Ongoing**

25 Anticipated Outcomes from the Constellations in 2010

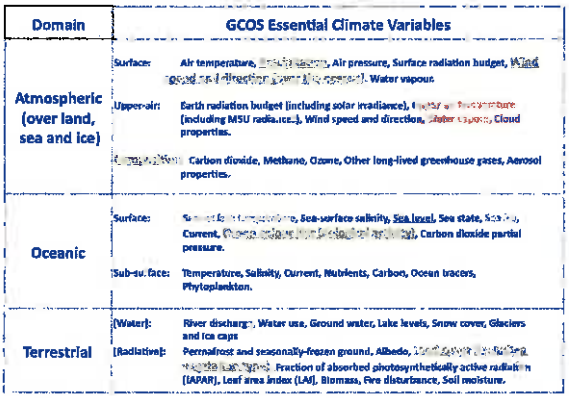
Mary presented on behalf of the CEOS Virtual Constellation leads on the anticipated outcomes for 2010.

All six Constellations are engaged in various stages of activities, including: collaboration on calibration/validation and algorithm development; agreement for timely exchange of data and products; standardization of products and formats; generation of integrated, multi-mission products and distribution from a central site; training & capacity building for both researchers and operational users; definition of requirements for future systems; and, harmonization of orbits to optimize observational coverage.

She presented a number of updates on plans for the VCs for 2010 and beyond.

- **ACC and LSI:** WGISS-supported data portals – to help address the need for accessibility and interoperability;
- **LSI:** Contribution of LSI data to the FAO Forest Resources Assessment 2010 Project, and establishment of a WG on Regional Data to coordinate LSI data contribution to the Global Land Survey 2010;
- **OSVW and OST:** Workshop on the "Use of Satellite Wind and Wave Products for Marine Forecasting" planned for December 2009, and working to address deficiencies in the operational utilization of observations from OSVW & OST Constellations;
- **OST:** Continue to work with the altimetry community to realize the recommendations put forth in The Next 15 Years of Satellite Altimetry document;
- **PC:** ISRO & CNES have augmented ground-station coverage for Megha-Tropiques;

Mary noted that a number of the GCOS ECVs are being observed by the CEOS VCs, but suggestions have been received (eg in connection with the recent Ocean Observing Conference in Venice) that CEOS VCs be initiated to address other ECVs, including sea surface temperature, sea ice, and measurements from radio occultation techniques.



Domain	GCOS Essential Climate Variables
Atmospheric (over land, sea and ice)	Surface: Air temperature, [illegible], Air pressure, Surface radiation budget, Wind speed and direction (over the ocean), Water vapour
	Upper-air: Earth radiation budget (including solar irradiance), [illegible] (including MSU radiance), Wind speed and direction, Water vapour, Cloud properties.
	[illegible]: Carbon dioxide, Methane, Ozone, Other long-lived greenhouse gases, Aerosol properties.
Oceanic	Surface: [illegible], Sea-surface salinity, Sea level, Sea state, Sea ice, Current, [illegible], Carbon dioxide partial pressure.
	Sub-surface: Temperature, Salinity, Current, Nutrients, Carbon, Ocean tracers, Phytoplankton.
Terrestrial	(Water): River discharge, Water use, Ground water, Lake levels, Snow cover, Glaciers and ice caps
	(Radiative): Permafrost and seasonally-frozen ground, Albedo, [illegible], Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Biomass, Fire disturbance, Soil moisture.

Observations being collected by current Constellations are underlined
Observations that could be collected by new Constellations are in red font

She stressed that the opportunity exists to more fully realize the objective of CEOS through the Virtual Constellations, but that the six existing Constellations represent an excellent start. She thanked the VC leads for their dedication to making the VCs work.

Gilberto asked about the overall direction that the VCs are headed in, and how we assess the success of these constellations. Mary cited the strong support of the OST Constellation, including international collaboration achieved there on measurement continuity, as one example of how to measure success. She also reiterated that organizations are now coming to CEOS to discuss creating constellations as possible new directions that VCs may take.

26 Anticipated Outcomes from the CEOS WGs in 2010

Pascal Lecomte (ESA) outlined the overall CEOS Working Group priorities for 2010:

- Closely coordinate with CEOS and SIT;
- Strengthen internal coordination and cooperation;
- Provide satellite arm of GEO System of Systems;
- Work closely with and support CEOS Virtual Constellations;
- Work closely with and collaborate as appropriate within the Working Groups; and
- Support enhanced outreach for CEOS activities.

WGISS priorities for 2010 include:

- Supporting the initiation of new promising projects and interest groups related to: network security; GEO Water CoP Portal; CWIC, the CEOS WGISS Integrated Catalogue; global DEM quality review; and, data management;
- Continue to support GEO through a variety of tasks;
- Cooperate with Constellations to develop and/or improve capability of portals; and
- Continue supporting the Data Democracy program, making available software packages.

WGCV priorities for 2010 include:

- The development of the COVE tool;
- Revision of the WGCV 5-year Plan and find a new Vice Chair;
- Continue the implementation of QA4EO;
- Work with the Constellations to identify calibration and validation requirements; and
- Work closely with and collaborate as appropriate with WGISS and WGEdu, for example on Global DEM quality, and on QA4EO training and outreach.

WGEdu priorities for 2010 include:

- Support CEOS response to GEO CB tasks;
- Support WGCV in outreach aspects of QA4EO, and build closer links with WGISS and WGCV;
- Work with Constellations in the area of outreach;
- Organise one Remote Sensing Workshop (Brazil, March 2010, in coordination with INPE);
- Develop the GNC Training Channel concept; and
- Produce one "Eduflow" training module addressing ocean/coastal ecosystem issues.

Pascal proposed a side meeting at SIT-25 between the three Working Group Chairs and the Constellation leads to discuss improved coordination among them.

27 CEOS Priorities and Outcomes for 2010

Makoto Kajii (JAXA), incoming SIT Chair, presented the CEOS priorities for 2010:

- Forest Carbon Tracking;
- GHG From Space;
- Data Democracy;
- High Profile CEOS Publication; and
- Gap analysis

Gilberto Câmara (INPE) asked CEOS to revisit its directions and whether CEOS could do more to help some of the SBAs. He hoped that there can be more emphasis on end to end applications in the vein of the FCT approach. He indicated that he plans to examine the areas within GEO that might lead to more such initiatives – as well as continuing the current activities. Ivan Petiteville (ESA) supported Gilberto's comments and noted the identification of new priorities within GEO, based on José Achache's presentation. Mauro Facchini (EC) asked whether Climate Change is within the JAXA priorities and Kajii agreed that it was a 2010 priority and would be elaborated at the next SIT-25 meeting in Tokyo. Mitch Goldberg (NOAA) recalled that SBSTA has invited CEOS to provide a formal update on its climate activities in late 2010 and suggested that this be considered a separate priority/outcome.

28 Calendar November 2009 - November 2010

Hilcéa Ferreira (INPE) presented an overview of planned CEOS meetings for 2010.

SIT Meetings

- Meeting with GEO Secretariat, mid-end of December 2009;
- CEOS Action Workshop, end of January, DC area (hosted by NASA);
- SIT-25: April 13-14, 2010, Tokyo, Japan; and
- SIT-26: TBD.

Working Groups

WGCV	*WGISS*	*WGEdu*
WGCV-31, early March, NIST, USA	WGISS-29, 17-21 May, UNOOSA, Bonn, Germany	WGEdu, May 2010, CONAE, Argentina
WGCV-32/WGISS-30, 13-17 September, CSA, Canada		

Virtual Constellations

Land Surface Imaging	*Ocean Surface Topography*	*Atmospheric Composition*
Last week of February, Brazil	15th IOCCG/OCR, 18-20 January, Rio de Janeiro, Brazil	TBD
Precipitation	*Ocean Color Radiometry*	*Ocean Surface Vector Winds*
TBD	TBD	TBD

INPE proposed that the 24th CEOS Plenary be held 13-15 October, 2010 in Rio de Janeiro, Brazil. The Plenary date is earlier than normal (November) as GEO Plenary and the GEO Ministerial will be held earlier (3-5 November) in order to accommodate COP-16, which will be held in Mexico, 8-19 November, 2010.

Brent Smith (NOAA) noted that the IAF will be held the week of 27th September in Prague.

Gilberto Câmara (INPE) asked for confirmation that there will be a SIT-26 meeting. Makoto Kajii (JAXA) noted that the plan is to hold one formal SIT meeting of Principals in 2009, with an additional working-level SIT meeting, if required. Mary Kicza (NOAA) suggested making an assessment on the need for a second SIT meeting in 2010 (working-level) after the January action review meeting.

23-19	**CEOS Chair and SIT Chair will confer to finalise the Calendar of meetings for 2010**	**February 2010**

29 CEOS Publications and Outreach

Satoko Miura (JAXA) presented a summary of the CEOS Publications and Outreach plan for 2010. She noted that 4000 copies of the 33rd CEOS Newsletter were distributed in 2009, and that 7000 copies of the CEOS Brochure were printed, and some will be available at GEO-VI. The 34th CEOS Newsletter will be published in February 2010, and articles due Friday 18th December, 2009.

Pakorn Apaphant (GISTDA) announced that a High-Level CEOS publication is planned for release in conjunction with GEO-VII and the GEO Ministerial. 2000 copies are planned, and a task team comprising the Troika, CEO, SEO, identified Deliverable leads, and other interested individuals will be formed to implement this effort under GISTDA's leadership. Makoto Kajii (JAXA) noted that this publication is crucial for next year to provide CEOS with high-level exposure.

30 Future SIT & CEOS Chairmanship

Makoto Kajii (JAXA) presented a summary of the CEOS SIT priorities and outcomes for 2010.

- JAXA seeks to maintain the momentum of space agency progress on the GEOSS Space Segment; JAXA will seek to emphasise tangible achievements of CEOS to policy makers;
- JAXA wishes to enhance communication with GCOS and other key climate bodies;
- JAXA hopes that SIT will provide a forum for discussion among Principals and to find new cooperation areas in future;
- SIT-25 will be held 13-14 April, 2010 in Tokyo, Japan; and
- JAXA asked for support of all agencies towards the SIT objectives.

Makoto Kajii thanked Darasri Dowreang (GISTDA) for her hard work as CEOS Chair, and Mary Kicza (NOAA) for her hard work as the CEOS SIT Chair.

Gilberto Câmara (INPE) led a discussion on how to inspire the CEOS community to go forward. He noted that CEOS has progressed considerably in the last 5 years. He suggested that global space budgets are around the $40Bn level. He asked where space agencies will be in 2050 and how they will get a sense of connection to society. Gilberto suggested that Earth observation is the key connection. He referred to the importance of data access to facilitate application of satellite information. The trend towards open access data policies will enable the GEOSS to succeed. He hoped that the FCT task will lead to a Global Forest Information System.

Gilberto suggested that the Constellations are working and should be maintained. He stressed the importance of the Data Democracy efforts within CEOS. He asked about the water-related tasks in CEOS and whether new services could be established cooperatively. He stressed that the future for the space sector is in Earth observation and that CEOS has the power to change the perspective our society has about the space programme.

Roberto Trigo (CDTI) confirmed that CDTI will serve as CEOS Chair for 2011. Rajeev Jaiswal (ISRO) confirmed that ISRO is willing to take on CEOS Chair for 2012. ISRO has many Earth observation satellites and the new ISRO Chairman is delighted for India to take on this role.

23-20	**CEOS Chair to secure confirmation in writing from ISRO that they are willing to serve as Chair for 2012**	**January 2010**

31 Short Agency Reports

CSIR: South African National Space Agency-Satellite Applications Centre

Wabile Motswasele (CSIR) presented a summary of recent activity in the formation activities of the South African National Space Agency (SANSA). He noted that the South African National Space Agency (SANSA) is currently being formulated, with a business plan to be submitted and a CEO to be appointed in early 2010. For the interim, CSIR will continue to represent South Africa within CEOS.

CSIRO: Australian Space Policy Developments

Alex Held (CSIRO) presented a summary of the long awaited Australian Space Science Program, currently under the purview of the Department of Science and Industry in Australia. In parallel with this program, the Australian government has established a Space Policy Unit to study the role of space within Australia, which may eventually lead to the founding of an Australian Space Agency.

DLR

Klaus Schmidt (DLR) directed members to the written DLR report, noting that Envisat's lifespan has been extended to end of 2013, RapidEye is currently operating, and TANDEM-X is in development. DLR is making a large contribution to GMES, which DLR hopes will have a long lasting future.

EC: GMES Update

Mauro Facchini (EC) noted the recent release of a communication on GMES available at http://ec.europa.eu/gmes/pdf/communication_589_en.pdf. He reviewed some of the next steps for GMES, data policy (free and open), governance (involving EC, ESA, EUMETSAT), and plans for international cooperation.

ESA: Status of GOCE and SMOS

Simonetta Cheli (ESA) directed CEOS to the ESA presentation for a detailed update. She presented a summary of ESA's Earth Explorer missions, including news of the recent launch of SMOS, and reported that the instrument sensor antenna has been deployed nominally.

ISRO: EO Updates from Last Plenary

Rajeev Jaiswal (ISRO) presented a summary of ISRO's recent Earth observation program, including the launch of 54 missions over four decades.

He noted that ISRO's program is user demand driven, and is divided into four categories: natural resources, livelihood support, disaster management, and community outreach.

JAXA: ALOS Kyoto & Carbon Initiatives

Satoko Miura (JAXA) presented the latest status of JAXA's Kyoto and Carbon Initiative, nothing that this initiative produces global SAR mosaics of 50m resolution twice a year. She presented a summary of JAXA's deforestation monitoring activities, and noted that JAXA is currently operating a "Quick Forest Observation Chain" with partner agency IBAMA in Brazil.

NRSCC: Progress or In-flight Calibration of HJ-1A/HIS

Li ChuanRong (NRSCC) presented a summary of the HJ-1A/HIS sensor, launched in September 2008, that became operational in March 2009. He noted that HJ-1C, a SAR satellite, will be launched soon.

UNOOSA: Updates

Mazlan Binti Othman (UNOOSA) noted that UNOOSA is the only branch of the UN with a broader mandate for space activities. She expressed her pleasure in being able to support, and have the support of CEOS. She indicated that UNOOSA is happy to re-engage in the CEOS Working Groups, including WGCV and WGEdu.

GISTDA: THEOS Current Status and Update

Monchaya Piboon (GISTDA) presented a summary of the recent THEOS activities, ground station and training activities that have recently taken place. After one year of operation, THEOS has captured over 100,000 images, and currently there are three image products offered: PAN, MS Level 1 A; PAN, MS level 2 A; and, PAN-sharpened. Data applications are being sought widely across the Thailand government. Future enhancements include a polar station, ortho-image production, and a global online data service.

32 Chair Handover

Darasri Dowreang (GISTDA) thanked all CEOS Members and Associates for their contributions, commitments and support throughout the year, which account for the achievements of CEOS. She thanked Wabile Motswasele (CISR) for his support in GISTDA's transition into the CEOS Chair role. She thanked Mary Kicza (NOAA) and the SIT Team for their hard work over their past two years during their term as CEOS SIT Chair. She thanked Gordon Bridge as the outgoing Chair of WGEdu for his efforts during his term, and Martha Maiden for her term as WGISS Chair.

33 Closing Remarks

Gilberto Câmara (INPE) thanked Darasri Dowreang (GISTDA) and the GISTDA team for the efforts through the year, and for their effort in making the 23rd CEOS Plenary a success. He invited all CEOS participants to the 24th CEOS Plenary, to be held in Rio de Janeiro, Brazil.

34 Adjourn

As the new CEOS Chair, Gilberto Câmara (INPE) adjourned the meeting.

List of Participants

Agency	Name
BNSC	Paula Freedman
BNSC	Mark Churchyard
CDTI	Roberto Trigo
CNES	Pascale Ultre-Guerard
CONAE	Conrado Varotto
CONAE	Laura Frulla
CSIR	Wabile Motswasele
CSIR	Asanda Ntisana
CSIRO	Alex Held
DLR	Klaus Schmidt
EC	Mauro Facchini
EC	Mark Dowell
ESA	Simonetta Cheli
ESA	Evangelina Oriol-Pibernat
ESA	Ivan Petiteville
ESA	Stephen Briggs
EUMETSAT	Paul Counet
EUMETSAT	Robert Husband
EUMETSAT	Lars Prahm
FAO	John Latham
GEOSEC	José Achache
GEOSEC	Michael Tanner
GISTDA	Darasri Dowreang
GISTDA	Pakorn Apaphant
GISTDA	Poonthip Sirikulchayanon
GISTDA	Chaowalit Silapathaong
GISTDA	Taksaporn Sungsiri
GISTDA	Somchet Thinaphong
GISTDA	Amornthep Rochanasaroj
GISTDA	Thaweesak Tuchinda
GISTDA	Anond Snidvongs
GISTDA	Suvit Vibulsresth
GISTDA	Chanchai Peanvijarnpong
GISTDA	Supapis Polngam
GISTDA	Monchaya Piboon
GISTDA	Stephen Ward
GISTDA	George Dyke
INPE	Gilberto Câmara
INPE	Julio Dalge
INPE	Hilcea Ferreira
ISRO	Rajeev Kumar Jaiswal
JAXA	Makoto Kajii
JAXA	Satoko Miura
JAXA	Chiyoshi Kawamoto
JAXA	Osamu Ochiai
JAXA	Yasushi Horikawa
JAXA	Hiroshi Murakami

Appendix 1 - List of Participants

KARI	Hyo-Suk Lim
KARI	In-Kyu Jeon
NASA	Richard Eckman
NASA	Mike Freilich
NASA	Brian Killough
NASA	Stephen Ballard
NASA	Shelley Stover
NOAA	Mary Kicza
NOAA	Kerry Sawyer
NOAA	D. Brent Smith
NOAA	Mitch Goldberg
NRSCC	Li ChungRong
NRSCC	Tang LingLi
NRSCC	Guocheng Zhang
NSC	Per Erik Skrøvseth
UNOOSA	Mazlan Binti Othman
UNOOSA	Lorant Czaran
USGS	Timothy Stryker
USGS	Bryant Cramer
WGCV/ESA	Pascal Lecomte
WGCV/ESA	Marie-Claire Greening
WGEDU/EUMETSAT	Gordon Bridge
WGISS/NASA	Martha Maiden
WMO	Barbara Ryan

23rd CEOS Plenary Actions
v1.0

No.	Action	Due Date
23-1	CEOS agencies asked to support the 2010 update of the CEOS Missions, Instruments and Measurements database	CEOS 24
23-2	CEOS Chair and SIT Chair, in consultation with CEOS SEC and CEOS Troika, to poll CEOS agencies to identify candidates for the CEO position from November 2010	CEOS 24
23-3	SEO to implement on-line CEOS-GEO action tracking tool to help address the administrative burden of this activity	January 2010
23-4	CEOS agencies to provide opinions to INPE as to the most important efforts to be pursued in 2010 in the Data Democracy initiative	January 2010
23-5	CEOS Chair to cooperate with GEOSEC to provide a letter accompanying submission of the GEO Carbon Report to UNFCCC SEC ahead of COP-15; and to ensure copies are available at CEOS & GEO events in Copenhagen	End November 2009
23-6	CEOS and SIT Chairs to work with the FCT Co-Leads to confirm CEOS agency commitments and timetable for processing and product development for the 2009 GEO Forest Carbon dataset	December 2009
23-7	CEOS Climate SBA Coordinator to work with SIT Chair to: coordinate CEOS review of the updated GCOS IP; establish a coordinated CEOS Response to the Updated GCOS IP; and associated progress report to SBSTA of UNFCCC	31 January 2010 (review) October 2010 (response and SBSTA report)
23-8	CEOS Climate SBA Coordinator to work with SIT Chair to respond to GCOS on the issue of the need for an update of the GCOS Satellite Supplement in 2010	April 2010
23-9	CEOS Chair to write to WMO (cc GCOS) indicating the value of the independent expert role of GCOS, the importance which CEOS places on its relationship with GCOS, and encouraging GCOS representation at future CEOS SIT and Plenary meetings	December 2009
23-10	On behalf of OST Constellation, CEOS Chair to raise issue of HY-2 availability with SOA/China in support of OST Constellation objectives	January 2010
23-11	Agencies interested in providing the next WGCV Chair term should forward nominations to WGCV Chair	SIT-25
23-12	GEO FCT Co-Leads to provide CEOS with the 2010 Data Requirements document and CEOS agencies encouraged to respond to meet the satellite data requirements therein	December 2009

23-13	**WGCV Chair to work with GEO FCT Co-Leads to identify the supporting role for WGCV in the calibration and validation aspects of the FCT initiative**	**April 2010**
23-14	**JAXA to confer with CEOS SEC on the way forward organisationally (esp. in relation to the ACC) for the activities currently promoted by the Carbon Task Force – including definition of Deliverables for the GEO Ministerial**	**April 2010**
23-15	**ESA, in consultation with CEOS Chair and SIT Chair, to set up a small team (including the Climate SBA Coordinator) to develop a coordinated approach to improve the management of climate-related activities within CEOS, reflecting the content of discussion at CEOS Plenary 23 - including mechanisms for an ECV-by-ECV analysis of progress by CEOS. A proposal for the way forward should be circulated in time for discussion at SIT-25.**	**SIT-25**
23-16	**CSIR to work with SFCG, supported by CEOS SEC, to prepare the document on socio-economic benefits of Earth observations**	**May 2010**
23-17	**ESA to circulate the WRC document to establish whether it might serve as the foundation for an official CEOS statement on frequency requirements (to be coordinated by CEOS SEC). CEOS Agencies encouraged to respond.**	**January 2010**
23-18	**CEOS Agencies to use the "WRC-12 SFCG Objectives" document when attending radio frequency related meetings with their national administrations, and to submit it to any relevant national or international forum.**	**Ongoing**
23-19	**CEOS Chair and SIT Chair will confer to finalise the Calendar of meetings for 2010**	**February 2010**
23-20	**CEOS Chair to secure confirmation in writing from ISRO that they are willing to serve as Chair for 2012**	**January 2010**