MINUTES OF THE 25th CEOS PLENARY MEETING

8th-9th November 2011
Lucca, Italy

1 Welcome and Opening Remarks

The Chair, Enrico Saggese (ASI), opened the meeting and welcomed participants to the 25th CEOS Plenary and to Italy. He recalled the long history of CEOS and the many accomplishments of space agencies through the organisation. He thanked all contributors to the CEOS effort throughout 2011 – including the SIT team, the CEO, and the SEO, as well as the ASI CEOS Chair team.

Local officials - Mauro Favelli (mayor of Lucca), Alessio Giuffrida (prefect of Lucca), and Maura Cavallaro (Vice President of the Provincial Government) added their welcome to participants and expressed their hope for a productive meeting and enjoyable stay.

2 Organisational and Membership Matters

Enrico Saggese noted the following membership matters had arisen in the course of the last year:

- an application for Associate status from the Global Geodetic Observing System (GGOS); and
- an application for Member status from the Netherlands Space Office (NSO).

GGOS is the official observing system of the International Association of Geodesy (IAG). It provides the observations needed to monitor, map and understand changes in the Earth's shape, rotation and mass distribution. It also provides the global frame of reference that is the fundamental backbone for measuring and consistently interpreting key global change processes and for many other scientific and societal applications, and which benefits science and society by providing the foundation upon which advances in Earth and planetary system science and applications are built. There is strong potential for GGOS participation within CEOS, including through the CEOS Virtual Constellations, and the Working Groups on Calibration and Validation, Climate, and Information Systems and Services.

The **NSO** was established in 2009 as the Netherland's Government focal point for space, and is responsible for execution of national space policy. The Netherland's national space policy focuses on Planet Earth (Earth Observation), Science & Exploration, Space Technology, and Daily Life (services to citizens), and is working to redirect from a technology driven strategy to a user/market driven one. The Netherlands has been involved in building the SCIAMACHY instrument on Envisat, and the OMI instrument on Aura, and is currently planning to build on OMI with the TROPOMI instrument, which is transitioning from Phase B to Phase C/D. The Netherlands is also an active contributor to GEO projects, and has two data processing centres.

Stefano Bruzzi (ASI) thanked the two applicants and asked that they leave the room briefly while Plenary discuss their applications for CEOS membership. He noted that NSO meets the criteria for acceptance as a CEOS Member agency, and GGOS meets those for an Associate agency – and recommended that 25th CEOS Plenary welcome both as the newest CEOS agencies. This was agreed by the meeting and the representatives were welcomed back to the meeting and

congratulated on their acceptance. Both organisations were invited to participate in the 25th Plenary as their new status allows.

25-1	**The CEOS web team (SEO) and CEO to update the CEOS membership and contact lists to include Global Geodetic Observing System (GGOS) as an Associate, and Netherlands Space Office (NSO) as a Member**	**December 2011**

3 Summary of Open Action Items from 24th Plenary

Stephen Ward (ASI) reviewed status of actions from the 24th CEOS Plenary.

No.	Action	Status (Due Date)
24-1	**CEOS Agencies encouraged to register their datasets and information resources with the GEOSS Common Infrastructure.**	**ONGOING (November 2010)**
24-2	**CEO to investigate the timeliness of data provided by CEOS agencies in response to activation of the Disaster Charter for the recent Pakistan floods, and report on any lessons learned.**	**COMPLETE REPORT DISTRIBUTED ON 3 MARCH 2011 & SUMMARY PROVIDED AT SIT-26**
24-3	**CEOS Chair to work with the SEO, outgoing and incoming CEO, and GEO Secretariat to study possibilities for rationalisation of the multiplicity of portals and tools provided by CEOS and its agencies (including the LSI portal and CWIC) in support of GEO objectives.**	**PORTAL STUDY WILL REPORT TO PLENARY**
24-4	**CEOS and SIT Chairs, aided by the CEO, to review and confirm current SBA Team Coordinators to check whether all are active or whether replacements are required. A related SIT-26 agenda item should be included.**	**PASSED TO CEOS SELF STUDY – WILL REPORT**
24-5	**CEOS Agencies encouraged to provide resources for populating the Data Democracy Portal datasets and training materials.**	**ONGOING WGEDU WILL REPORT**
24-6	**CEOS Chair, in consultation with SIT Chair, WGClimate Chair and CTF Co-Chairs, to poll opinions on the best way forward organisationally for the ambitions expressed by the CEOS Carbon Task Force.**	**NASA CO-CHAIR APPOINTED AND SIGNIFICANT PROGRESS DURING 2011. DOMAIN LEADS IN PLACE. CTF CO-CHAIRS WILL REPORT**
24-7	**CEOS Agencies to review and comment to Mitch Goldberg**	**COMPLETE**

No.	Action	Status (Due Date)
	on the draft CEOS Climate Action template.	
24-8	CEOS Chair to arrange a response to the recent request for assistance in a peer review of CDRs and ECVs received from GCOS & WCRP.	COMPLETE
24-9	Mitch Goldberg, in coordination with WGClimate, to lead development of the CEOS Response to the 2010 GCOS Implementation Plan, and to support GCOS as required for the development of the GCOS IP Satellite Supplement. CEOS Agencies encouraged to supply suitable supporting experts.	ONGOING REPORT @ PLENARY
24-10	CEOS Agencies with supporting missions are encouraged to respond to the request for support to JECAM. LSI will serve as the CEOS point of contact.	ONGOING REPORT ON AG-MON ISSUES (INC GEO-GLAM) UNDER EMERGING INITIATIVES
24-11	CEOS Agencies encouraged to provide nominations to WGISS Chair for the WGISS Vice-Chair role in 2011-2013, continuing as WGISS Chair 2013-2015.	OPEN WG CHAIRS WILL REPORT
24-12	CEOS Agencies encouraged to consider taking on responsibility for QA4EO secretariat and website maintenance.	OPEN INTERIM RESOURCES KEEPING WEBSITE RUNNING
24-13	WGCV will provide a list of CEOS endorsed reference sites over which CEOS Member Agencies should collect and provide information in order to facilitate interoperability and underpin internationally harmonised calibration/validation. The list will also include recommended resource requirements for active agency support of site instrumentation and maintenance.	CEOS RECOMMENDED CAL/VAL SITES AND PROCESSES ARE AVAILABLE ON THE CAL/VAL PORTAL, WGCV IS REQUESTING THAT CEOS MEMBERS CONTINUE COLLECTION OVER THESE SITES
24-14	CEOS Agencies to respond to the 2011 call for programme updates in support of the annual update of the CEOS MIM database.	2011 UPDATE COMPLETE PLENARY REPORT
24-15	CEOS Chair to liaise with GCOS on support for the COP-16 side event on observations, and to ensure synergy with the proposed CEOS side event.	COMPLETE
24-16	CEOS and SIT Chairs, in coordination with Climate SBA and WGClimate, to liaise with GCOS to plan coordination on the key GCOS documents and activities in 2011.	ONGOING

24-17	**CEOS Agencies to review the GEO Geohazards Supersites White Paper and to respond to the data requests therein (including the urgent requests for the GEO Ministerial). Incoming CEOS Chair and SIT Chair will ensure suitable coordination and interface.**	**COMPLETE**
24-18	**CEOS Agencies requested to support the coordinated FCT data acquisition strategy in 2011.**	**ONGOING STRONG EFFORT FCT REPORT @ PLENARY**
24-19	**CEOS Chair to seek guidance from GEO (GFOI Task Force) on future data coverage priorities – and how these might be driven by linkages with World Bank, UN-REDD, and Paris-Oslo (REDD+).**	**CEOS DATA STRATEGY FOR GFOI/FCT SUBMITTED FOR PLENARY ENDORSEMENT**
24-20	**CEOS Chair will request the GEO FCT Task to provide a status report on the development of products from data supplied to date and their exploitation by ND authorities.**	**COMPLETE SEE GEO-VII PD TEAM REPORT**
24-21	**CEOS agencies to provide final comments on the proposed Terms of Reference for the standing Working Group on Climate and to respond to the expected request for representatives.**	**COMPLETE**
24-22	**CEOS Chair, in coordination with WG Chairs and CEOS SEC, to develop a proposal for CEOS Plenary 25 for how best to incorporate ambitions of the Data Democracy initiative within the CEOS structure.**	**COMPLETE**
24-23	**CEOS Chair to contact CGMS and WMO to explore possibilities for closer coordination on radiofrequency matters and to bring a proposed way forward to SIT-26.**	**SIT-26**
24-24	**CEOS representatives to the GEO Ministerial Task Force to coordinate the conclusion of the CEOS inputs to the various GEO Summit related meetings.**	**COMPLETE**

4 Report from the Chair: Accomplishments and Challenges

Enrico Saggese asked Stefano Bruzzi to report on the CEOS Chair accomplishments and challenges for 2011, noting that progress has been made in nearly all areas, and that CEOS continues to evolve to meet community needs and optimise coordination. Expected outcomes for the 25th CEOS Plenary include:

- Discussion of CEOS support to climate studies and to the establishment of space-based climate monitoring architecture;
- Discussion of CEOS support to the GEOSS Common Infrastructure (GCI), and associated data access schemes;

- Identification and quantification of CEOS contributions to the GEO Strategy for Carbon Observation;
- Progress in defining the CEOS contributions to Global Forest Observations Initiative (GFOI);
- Evolution of the Working Group on Education, Training, and Capacity Building to include Data Democracy;
- Consolidation of new initiatives and establishment of a way forward;
- Receive the results of the self-study and indicate the follow-on actions;
- Acknowledge progress in the area of Virtual Constellations (VC) and endorse the new Sea Surface Temperature (SST) VC; and
- Prepare the CEOS presence for Rio+20.

He noted that GEOSS remains a major point of user engagement for CEOS, and that it presents a very wide range of potential applications. CEOS, through building blocks like the Virtual Constellations and WGClimate, has progressed in its implementation of significant components of the GEOSS space segment. In this way, CEOS is beginning to move beyond the blind delivery of data, to the coordination of data providers and sources and the identification of products and customers. While it is important to replicate this success as the implementation of the GEOSS space segment continues, CEOS also needs to review and clarify its criteria for accepting new initiatives, ensuring that they fit well with the overall objectives of CEOS and GEO.

Stefano suggested that the trend towards a focus on deliverables is a welcome direction in 2011. He thanked all contributors to the CEOS effort throughout the year.

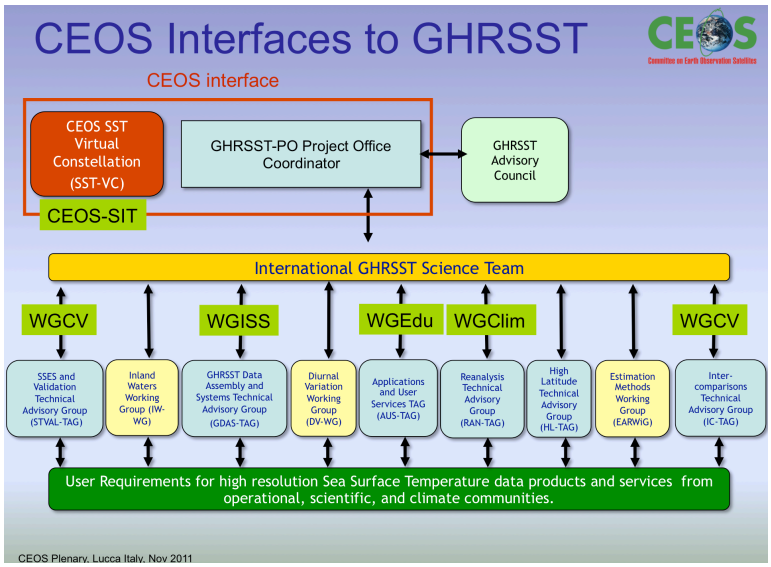
5 SIT Session to Review Sea Surface Temperature (SST) Virtual Constellation Full Proposal

Makoto Kajii (JAXA) introduced the full proposal presentation of the SST Virtual Constellation, noting some of the key milestones:

- SIT Technical Workshop, 2010 September: pre-proposal was presented and discussed;
- 24th CEOS Plenary: information on a potential CEOS SST Virtual Constellation presented;
- 24th CEOS Plenary and SIT-26: initial proposal was submitted and circulated for review;
- SIT-26, 2011 May: initial proposal presented, discussed, and approved;
- SIT Technical Workshop, 2011 September: concept of the SST was introduced again; and
- Prior to 25th CEOS Plenary: full proposal circulated to CEOS members.

SST Full Proposal Presentation

Ken Casey (NOAA) proposed the implementation of the SST-VC, building on the existing Group for High Resolution SST (GHRSST) framework. He noted that following this approach, the CEOS SST-VC has instant access to: a baseline SST virtual constellation; internationally agreed SST products and services including data access, user support services; an initial consensus technical documentation for the constellation; and a functional coordination mechanism active at the international level (Science Team, Advisory Council, Project Office).



A number of working interfaces are also envisioned linking to the CEOS Working Groups.

The benefits of this approach include: strengthening of CEOS Agency SST activities through better synergy and communication; encouraging wider participation; improving SST product and service interoperability; facilitation of better data access and product applications; providing value for money by capitalising on the investments already committed to GHRSST; and allowing a rapid spin up of SST-VC activities with minimal overhead. The proposed activities of the SST-VC include the development of an improved satellite SST Essential Climate Variable (ECV) record in response to the Global Climate Observing System (GCOS) Implementation Plan, and which is directly complementary to the work of WGClimate. Other activities include further development of the Virtual Constellation, coordination of reference documents, improved calibration and validation, improved user feedback, and improved training activities.

The SST-VC is currently being co-lead by Ken Casey (NOAA), and Craig Donlon (ESA), and also includes members from EUMETSAT, NASA, JAXA, and the University of Miami. Should the proposal be accepted, a full Implementation Plan will be prepared per the Constellations Process Paper, and membership would be expanded to include members from a number of other CEOS agencies.

SST Full Proposal Discussion

CEOS Plenary discussed the SST VC full proposal. Mary Kicza (NOAA) encouraged that the SIT accept the SST VC proposal. Stephen Briggs (ESA) confirmed the strong support of ESA for the proposal and hoped that other agencies would participate. Mike Freilich (NASA) added his voice of support to the proposal. Further support was offered by ISRO (Kiran Kumar Seelin), GCOS (Carolin Richter), Roshydromet (Alexander Uspensky), UKSA (Ruth Boumphrey). Mr. Kajii confirmed SIT acceptance of the Full Proposal and congratulated the SST VC on being the newest CEOS Virtual Constellation.

25-2	**SST-VC Team to prepare a full Implementation Plan, per the Constellations Process Paper, in time for review at SIT-27**	**SIT-27**

6 5th Annual Report on CEOS Implementation of the GEOSS Space Segment

Makoto Kajii presented a summary of 2011 progress towards the GEOSS Space Segment with an emphasis on CEOS Virtual Constellations. He noted that GEO Actions AR-09-02a calls for CEOS Virtual Constellations to provide improved temporal, spatial, and spectral resolution, and related data management and dissemination. The top five accomplishments and issues for each of the Constellations were reviewed.

Atmospheric Chemistry (ACC) (Leads - Richard Eckman, NASA; Claus Zehner, ESA)

- Added value of Volcanic Ash monitoring by satellite demonstrated (e.g. Icelandic volcanic ash);
- Air Quality Constellation position paper endorsed at SIT-26;
- Total ozone set inter-comparison;
- Supplied draft response to CEOS response to GCOS IP; and
- AC Portal is under WGISS control.

Land Surface Imaging (LSI) (Leads - Tom Holm, USGS; P.G. Diwakar, ISRO; Julio Dalge, INPE)

- Mid-resolution optical guidelines finalized and released in August 2011;
- LSI Portal enhanced map-based query and direct data download;
- Support for FCT/GFOI and JECAM requirements;
- Free and Open-Source Tools for GIS available on-line; and
- Definition of LSI role in support to terrestrial ECVs.

Precipitation (PC) (Leads - Riko Oki, JAXA; Steven Neeck, NASA)

- Enhancement of PC Space Segment (e.g. progress in GPM implementation, Megha-Tropiques launch);
- Implementation of improved TRMM algorithm (Version 7);
- Improvements in inter-satellite calibration techniques through the X-Cal WG;
- Data availability from Chinese (CMA) & Russian (ROSHYDROMET) microwave imagers is an issue; and
- Conical scan MW imagers availability in late-GPM phase and post-GPM phase (>2018) is also a challenge.

Ocean Colour Radiometry (OCR) (Leads - Peter Regner, ESA; Prakash Chauhan, ISRO; Paula Bontempi, NASA)

- IOCCG standing WG for evaluation of ECVs established, Chair selection underway;
- IOCCG Level-1 Requirements report target completion Dec 2011;
- INSITU-OCR WG in progress, Chairs established;
- INSITU-OCR white paper outline by end of November 2011; Workshop February 2012; and
- iOCRT for 2013, IOCCG engagement of academic community at 2012.

Ocean Surface Topography (OST) (Leads - François Parisot, EUMETSAT; Eric Lindstrom, NASA)

- Continuity of Climate Record for Sea Level (Jason-1, -2, -3, and Continuity of Service follow-on mission);

- Continuity of Complementary Coverage (Cryosat-2, ENVISAT, ERS-2, SARAL/AltiKA, Sentinel-3A, B) and their phasing in the constellation;
- Data Policy– timely access to data from the Chinese HY-2A;
- Harmonized, Easily Accessible Altimeter Products (AVISO & RADS portals, Cryosat-2 Ocean Product); and
- Training and Workshop organisation.

Ocean Surface Vector Wind (OSVW) (Leads - Hans Bonekamp, EUMETSAT; Paul Chang, NOAA; B.S. Gohil, ISRO)

- Continuity of Ku-band (QUIKSCAT, OSCAT/Oceansat-2, OSCAT follow-on);
- Continuity of C-band (ASCAT/METOP, EPS-SG, ERS-2);
- Integrating Ku-& C-band OVW products;
- Timely Data Access for Chinese (SOA) & Russian scatterometers; and
- Training courses.

Additional comments from VC leads

Rich Eckman (NASA) noted that the ACC had decided not to proceed with the Ozone ECV pilot activity, and that WGISS is supporting the ACC portal.

Greg Stensaas (USGS) on behalf of Tom Holm, noted the progress of FCT/GFOI and the new ISRO Co-Chair in support of the LSI VC team. John Faundeen is likely to replace Tom Holm as the USGS co-lead for LSI.

Mark Dowell (JRC) for the OCR VC team, noted that a standing WG has started in the IOCCG on ECV assessments.

Mr. Kajii noted that there is a role for the Constellations to support both the development of the WGClimate's activites, and to help CEOS support the GCI through data portals and the CEOS International Directory Network (IDN). He noted that CEOS is most effective when presented with a comprehensive statement of user requirements – per the IGOS Theme Reports, the GCOS IP, and the GEO Carbon Strategy. These have all led to corresponding observation strategies – such as the CEOS Response to the GCOS IP and the CEOS Carbon Strategy document in progress. Mr Kajii suggested that the VCs should be an integral part of the development of these CEOS observing strategy documents. He stressed the importance of focusing on actual data provision by CEOS and by the VCs. He gave an example outline of a coordination scheme in support of water information needs.

Mr. Kajii concluded, noting:

- Constellations are progressing well;
- There is still a general issue of access to Chinese and Russian satellite data in support of the Virtual Constellation objectives and this will need further attention in the future;
- GCI enhancement thanks to the new interface with the IDN has been well coordinated and Constellations are encouraged to support in terms of data supply and registration;
- The model for coordination in response to a comprehensive statement of requirements (such as the GEO Carbon Strategy) is an effective model for CEOS; and
- As a part of the GEOSS architecture, data is to be provided online.

Recommendations from outgoing SIT Chair

Mr. Kajii reviewed progress in the last two years under his SIT Chairmanship. Key deliverables in 2010 included: the CEOS document for GEO Ministerial; the Carbon Task Force; the

contribution to the FCT; the establishment of the WGClimate; and, the promotion of Data Democracy principles.

Mr. Kajii recommended that:

- Visibility of CEOS activities to stakeholders is key to ensure continued funding and political support for our endeavours;
- CEOS must stress tangible outcomes – such as the delivery of data and ECVs; and
- Teamwork is essential to the effective operation of CEOS – and he thanked all the CEOS officeholders for their contribution these past two years, in particular the CEO and DCEO;

NRSCC encouraged that we don't proliferate independent data portals and also hoped that the VCs could stimulate greater cooperation in joint research, in addition to data sharing.

Mary Kicza thanked Mr. Kajii and the JAXA SIT Team for all their efforts over the past two years, and Stefano Bruzzi seconded this.

7 GEO Report

José Achache (GEO Secretariat) reported

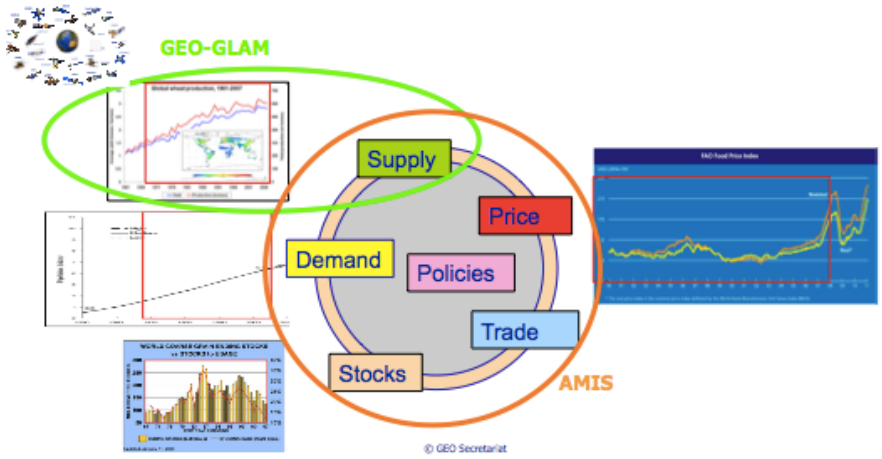
- Colombia and Peru have joined GEO as Members, bringing the total number of Members to 89 and 61 Participating Organizations;
- The coming GEO Plenary will decide upon the new GEO Work Plan for 2012-15 and its new management structure;
- It will also cover the GCI's ability to provide full and open access to Earth observation data and to information, including implementation of the GEOSS Data-CORE;
- The Plenary will also review new initiatives and "Operational" Programmes (GEO-GLAM, GFOI, Supersites, GEOBON).

The 2012-15 Work Plan is structured along three lines: Infrastructure (Architecture and Data Management); Institutions and Development (Capacity Building, Science and Technology, User Engagement) and Information for Societal Benefits (Contribution to End-to-end Services).

GEO-VIII will discuss planning for the post-2015 era and likely launch a working group for that purpose, with a first meeting in March/April 2012 reporting progress to GEO-IX. Institutional, governance, and prioritization issues are all in the mix for this effort.

José suggested that the key to success in GEO is the coordinated access to data. He sees a possible tension between data for public needs and the new markets for geo-information, and commercial ventures. Resolving these different interests will be a challenge. He gave the example of the progress towards the Forest Carbon Tracking (FCT) and GFOI (Global Forest Observations Initiative) objectives – and the data sharing and portal work therein. There are a series of National Demonstrators for which data are acquired in a coordinated way.

José also used the example of food security to illustrate the issues facing society and the opportunities for progress through GEO. The Joint Experiment on Crop Assessment and Monitoring (JECAM) is coordinating data acquisition over a range of different cropping systems and facilitating data sharing and inter-comparison of data. The food security issue was elevated by the recent G20 declaration – and announced launch of AMIS (Agricultural Monitoring Information System - with FAO) and GEO-GLAM (Global Agricultural Monitoring). The context of GEO-GLAM was explained using the schematic below:



The activity is critically dependent on coordinated data acquisition efforts.

José recalled the focus of the Supersites activity in relation to geohazards – noting the reluctance of data providers to contribute data to high-risk locations, as opposed to locations that have just experienced major hazard events. He noted the increasing demands on data providers for multiple domains in support of societal needs and suggested that this is the main challenge for CEOS in the next 10 years. Coordinated data access and making data available is the priority, however challenging.

Gilberto Câmara (INPE) recalled the significant achievements of José as GEO Secretariat Director in the past years, and the opportunities that GEO has given for space agencies and CEOS to be more relevant to society.

8 CEOS Support to the GEOSS Common Infrastructure (GCI)

Ivan Petiteville (ESA) reported that a major enhancement of GCI was agreed at 15th GEO ADC (Brazil, March 2011), which lead to the initiation of the "Sprint to Plenary" to provide a demonstration of those enhancements at GEO-VIII. Features to be implemented included:

- Simplify registration of GEOSS resources;
- Information on data quality and data access conditions to the registered datasets;
- Increase number of GEOSS resources discoverable (incl. datasets); and
- 'Easy' access to discoverable EO datasets.

The inclusion of the CEOS International Directory Network (IDN) as a part of the CEOS contribution to the GCI significantly increases the number of resources discoverable through the GEO Web Portal. CEOS agencies can also contribute by making their catalogues query-able in parallel. He noted that the CEOS WGISS Integrated Catalogue (CWIC) provides an interface between the GCI and specific catalogues at NASA, USGS, NOAA and INPE, and that catalogues from both major European space agencies including ESA and Commercial EO Data Distributors are being linked via Heterogeneous Missions Accessibility (HMA) protocol in the Global Monitoring for Environment and Security (GMES) framework.

The terms of use that apply to data made available through the GCI should adhere to the GEO Data Sharing Principles to the greatest extent possible, and should preferably include information on how to access those collections and the products they contain.

Overall, there has been a large improvement of the availability of data due to the inclusion of the IDN, HMA, and CWIC. However, worldwide, space agency infrastructure is heterogeneous, and there is no one-size-fits-all solution, but the contemporaneous use of a limited number of different technical solutions is perfectly acceptable.

9 Portals and Data Access Tools

Brian Killough (NASA) provided a summary of the recent SEO study on CEOS portals and data access tools, noting that this report was called for by CEOS Plenary action 24-3. The study (available for download at www.ceos.org/seo) evaluated six community portals, and two larger portals (GEO and IDN), and worked closely with WGISS to assess findings and develop recommendations.

Recommendation #1: CEOS should support the development of community portals to serve focused topics and support the development of larger portals with a focus on user diversity and effective data discovery and access.

Recommendation #2: WGISS should establish a set of guidelines for CEOS-endorsed community portals. Such standards would consider: background information, portal instructions, lists of missions and instruments, and methods for data access.

Recommendation #3: The CEOS IDN should add CEOS Missions, Instruments, and Measurements (MIM) nomenclature to the IDN set of "keywords" for data queries.

Recommendation #4: GEO should seek input from a variety of users (i.e., scientists, decision makers, general public) to improve navigation and discovery and access of data and information.

Recommendation #5: GEO should simplify the GCI registration process and place emphasis on registration of community data portals and aggregated services (such as catalogs) rather than individual data sets.

Recommendation #6: WGISS should continue work on a common metadata model for facilitating the search and discovery of satellite data.

Recommendation #7: WGISS should demonstrate the use of CWIC to connect a portal to data products residing on an agency server.

The study recommended that future portals focus on data discovery and access. A number of actions were proposed.

25-3	**CEOS agencies should work with the CEOS IDN team to register their data collections**	**CEOS-26**
25-4	**CEOS Agencies are encouraged to support the long-term funding necessary for the CWIC development & operations, and to work with WGISS to become a "CWIC Partner"**	**CEOS-26**
25-5	**WGISS should develop CWIC guidelines for future data partners to understand requirements**	**SIT-27**

25-6	**WGISS to engage related agencies and to lead an investigation into the opportunities and obstacles for the interoperability of HMA and CWIC, providing a report and recommendations to CEOS-26**	**CEOS-26**

A short demo video highlighting the features of CWIC was shown to Plenary.

10 GEO & GEOSS Session Discussion

Stefano Bruzzi confirmed that actions are underway within CEOS leadership on the engagement and inputs for GEO-VIII. He reminded Plenary of the messages in the GEO Secretariat presentation and welcomed the developments at the technical level within CEOS to address the data coordination and availability challenge.

Mike Freilich congratulated WGISS on the work undertaken to develop CWIC, and noted its potential contribution to the VC data sharing activities. It will be a key contribution toward the utility of the GCI. He urged all CEOS agencies to sign up for CWIC and to go through the simple registration process.

Gilberto Câmara thanked NASA for their execution of the Portals review and encouraged CEOS agencies to create the critical mass of engagement required in support of CWIC.

Pascale Ultré-Guérard (CNES) noted that CNES is working with, and has invested heavily in, the HMA standard and this is the same for all European agencies and would like to understand better what the compatibility issues will be in practice. Pascale suggested we could consider issuing a call for ideas on the most pressing data portals in support of CEOS initiatives – with WGISS taking charge of development guidelines. Mike confirmed that CEOS needs the action agreed to address the concerns regarding HMA and CWIC. Ivan Petiteville noted that there is not a direct mapping between CWIC and HMA functionality – there is some but not a complete overlap. He suggested that CWIC funding should be secured beyond the prototyping and that agencies should look further at the interoperability issues.

Barbara Ryan (WMO) referred to the WMO Information System (WIS) and noted that registration in the WIS automatically registers the data in the GCI. She asked whether the same would be true in registering for CWIC. Brian Killough confirmed that this is the case, via automatic registration in the IDN. He thanked the NASA technical team for their efforts in support of CWIC.

Mary Kicza referred to the post-2015 GEO Working Group and suggested that CEOS should consider how to engage and participate, with NOAA prepared to assist in this participation.

Stephen Briggs recalled the GEO Secretariat presentation and hoped that CEOS could keep sight of the priorities included as it plans the coming year and its activities. He repeated the need for CEOS to engage in planning the future of GEO.

25-7	**CEOS Chair and SIT Chair, in coordination with CEOS SEC, to ensure CEOS is kept informed and engaged in the post-2015 GEO planning process**	**CEOS-26**

José Achache encouraged CEOS participation in the post-2015 process and noted that the discussion will be progressed at GEO-VIII. He also noted that CEOS is a GEO Participating

Organisation (PO), and how the POs will be engaged is under discussion in the Executive Committee. Tim Stryker noted that in GEO Post-2015 Document, Participating Organizations were invited to nominate participants in the Working Group by February 2012, and that CEOS would be providing the names of its nominees to GEO.

José noted the rise of major data coordination efforts for public use – such as GFOI and GEO-GLAM - with significant implications for CEOS efforts and capacity.

Tim said that points of contact have been established within CEOS in support of the major GEO WP Components.

Stefano thanked José for his significant contribution to GEO and to CEOS objectives in the past years.

Gilberto announced that INPE would formally join the International Disasters Charter. INPE and CRESDA will also formally sign an agreement to provide CBERS-3 data to the newly funded Gabonese EO agency via a new ground station. It is hoped that other satellite systems can be received at the facility and redistributed freely to countries in the region for initiatives such as GFOI. He thanked CNES and GEO for their support in achieving this. Wen Xu (CRESDA) added his support to the new initiative and hoped this could be a significant contribution to CEOS objectives.

11 CEOS Strategy for Carbon Observations

Takashi Moriyama (JAXA) and Diane Wickland (NASA), the Carbon Task Force Co-Chairs, reported on the recent activities of the CEOS Carbon Task Force (CTF). The CTF is working to develop the CEOS Carbon Strategy, which responds to the GEO Carbon Strategy report. This response follows the model of the CEOS Response to the GCOS Implementation Plan - with carefully formulated actions/recommendations identified for each domain and for integration as the basis for monitoring and reporting. The CTF Co-Chairs have recognised that the GEO Carbon Strategy Report may not cover the full spectrum of societal needs and CEOS should aim to address this in its response document.

The vision for GEO's Integrated Global Carbon Observing System (IGCOS) is built around two complementary groups of observations: the main carbon reservoirs (pools) in the land, ocean, and atmosphere; and the exchanges (fluxes) among these reservoirs. It is designed to support two major products to be used by policy makers in implementing carbon policy: a robust and transparent carbon monitoring system; and, accurate carbon budgets at different scales.

The writing teams engaged thus far are (leads in bold):

- **Atmosphere: Berrien Moore (University of Oklahoma),** David Crisp (NASA JPL), Michio Kawamiya (JAMSTEC), Martin Heimann (Max Plank Institute), Peter Rayner (LSCE);
- **Land: Chris Schmullius (Friedrich-Schiller University Jena),** Shaun Quegan (University of Sheffield), Stephen Plummer (ESA), Sassan Saatchi (NASA JPL), Masanobu Shimada (JAXA); and
- **Ocean: Shubha Sathyendranath (Plymouth Marine Lab),** Watson Gregg (NASA GSFC), Nicolas Hoepffner (JRC), Johnny Johannessen (NERSC), Trevor Platt (Bedford Institute of Oceanography), Joji Ishizaka (Nagoya University).

Some of the challenges and requests of CEOS from the CTF are as follows:

- Chapter writing team representation; were unable to recruit co-authors from Africa, South America, or parts of Asia other than Japan;
- It has been difficult to make coordinated progress with only volunteer labour and no dedicated travel support (leveraging existing meetings is not working so well across the three domains);
- Some Domain Leads have asked about the possibility of travel support for meetings, including La Jolla in March 2012;
- Consultation meeting to follow SIT-27 in March 2012 will raise implementation (supply) questions and iterations will be needed (per model of GCOS IP response); exactly how this will work is not clear;
- Questions were raised at the SIT Technical Workshop in September 2011 about the adequacy of space agency involvement in developing the report; and
- CTF discussed this at their side meeting yesterday and believe the plan is adequate (each chapter has one or more agency participants and CTF members (or their designees) will be available to the authors for inputs).

On chapter writing team representation, Diane stressed that it is not too late to suggest additional authors (subject to domain lead concurrence). Agencies from under-represented geographical regions are especially encouraged to nominate authors.

25-8	**CEOS agencies invited to nominate additional authors in support of the CEOS Carbon Strategy report – contact the Carbon Task Force co-leads**	**December 2011**

Diane asked whether the CEOS agencies could help with travel for the writing teams and/or host a writing meeting, noting that support for co-author travel and a few small, dedicated meetings is believed to be necessary (one writing meeting each for domain chapter teams, plus one for integration seems a necessary minimum). NASA and JAXA have expressed a willingness to help with travel for leads and co-authors from their countries. ESA has contributed substantial time for Stephen Plummer to help coordinate the report and lead the integration activities, but more support is needed for the travel of other authors and logistics for dedicated meetings.

25-9	**CEOS agencies encouraged to support Carbon report co-author travel to the key meetings and to offer to host writing meetings. SIT Chair will issue a call for such support**	**December 2011**

CEOS is asked to ensure suitable space agency representation at the meeting for review and consultation on the Draft CEOS Response to GEO Carbon Strategy Report (immediately after SIT-27):

- Thursday 29th March – review of draft chapters (most important day); and
- Friday 30th March – follow-up working meeting of report authors.

CEOS space agency expertise and inputs will be required for report preparation, review, and finalisation.

25-10	**CEOS agencies to ensure expert representation at the Carbon Strategy Report review meeting in La Jolla on 29th March 2012**	**March 2012**

Agencies with supporting missions, who are not represented on the Carbon Task Force, are asked to identify a working contact that might be consulted on points of information in relation to their programmes and their measurement capabilities.

25-11	**Carbon Task Force Co-Chairs to contact CEOS agencies to establish points of contact able to supply programmatic information and clarifications in support of the Carbon Strategy Report**	**March 2012**

Stefano Bruzzi queried whether the lack of resources would impact the ability of the CTF to produce the required report. Diane suggested that it is possible that the report may be delayed.

12 Forest Carbon Tracking and the Global Forest Observations Initiative (GFOI)

FCT Status

Alex Held (CSIRO) presented a status update on the GEO FCT task activities. The objective of this task is to demonstrate that coordinated Earth observations, complimented and validated by *in situ* measurements and properly linked to forest models can provide the basis for reliable, accurate, consistent and continuous information services to support forest carbon Measurement, Reporting and Verification (MRV), leading to eventual establishment of a network of national forest carbon monitoring systems. The task includes four elements: a framework for coordination; a group of National Demonstrators; institutional arrangements to secure data access and continuity; and, an R&D program to support data integration and modelling. In 2010-11, the number of National Demonstrator countries grew from seven to 11.

Since 2009, more than 139,000 optical and SAR images have been delivered by CEOS Agencies, and significant progress has been made towards the development of the four task elements.

The second National Demonstrator Summit, and third Science and Data Summit will be held in February 2012 in Tanzania, and will focus on finalising the FCT R&D task. A number of technical workshops are scheduled around the world in the coming year.

GFOI Implementation Plan Overview and CEOS Support at GEO Plenary

Per-Erik Skrovseth (NSC) presented a summary of the Global Forest Observations Initiative (GFOI) noting that the GFOI will:

- Foster sustained availability of satellite and ground observation in support of national forest information systems; and
- Support countries in the use of observations for their national forest information systems-respecting national choices of data and tools.

This will be accomplished via two key components: observation supply and utilisation; and, guidance and application development. GFOI is an offspring of GEO Forest Carbon Tracking (GEO FCT) task, which has been supported by CEOS since 2008. GFOI will not engage in the actual supply of data, but will work with the space agencies and commercial providers to establish actual and potential supply of data, and address their costs. One of the first steps will be to carry out an assessment of initially 25 countries to establish their needs for data and current/envisaged supply. A GFOI implementation plan has been prepared this year and will be presented to the GEO-VIII Plenary in November.

Should the implementation plan be approved, steps for 2012 will include the establishment of a small management staff of 2-4 people with an estimated budget to range between $US 1-1.5 M annually during the first four years. A kick-off event will also be planned for 2012.

Endorsement of the CEOS GFOI-FCT Data Strategy & Space Data Coordination Group

Stephen Ward (Australia) presented the background and rationale for the CEOS Strategy for Space Data Coverage and Continuity in Support of GFOI/FCT. The strategy was developed in response to two SIT-25 actions:

- **25-10:** CEOS FCT participants, supported by CEOS Chair, to develop a CEOS Strategy Report on continuity and coverage plans year by year for 2010 – 2015 using public good data sources and identifying the role for high-resolution data; and
- **25-11:** CEOS & SIT Chairs to initiate a short study among participating agencies to report to CEOS Plenary on the institutional arrangements for management of the CEOS role in supporting FCT future development and expansion.

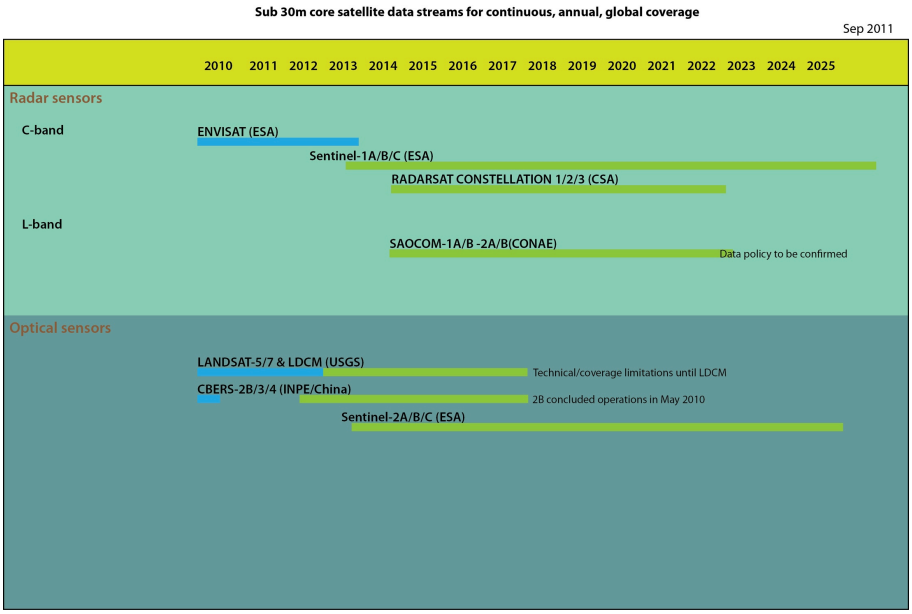
It anticipates the implementation of GFOI from GEO-VIII, and recognises the central role of space data in securing engagement of key forested countries. The endorsement of the Strategy by CEOS Plenary will signal to GEO-VIII that CEOS and space agencies are well prepared.

The Strategy takes into account that CEOS space agencies embrace a range of data policies, and that missions of all types are of interest for GFOI – and may be needed given the scale of the challenge. As a matter of principle, it focuses on the coordination of data made available for GFOI purposes on a free of charge basis (whilst taking account of known plans for data which is not). The Annual CEOS coordinated acquisition strategy will clearly identify observational gaps and needs that might be served by industry or by data donors.

The basic strategy includes three elements.

1. A baseline, coordinated global data acquisition strategy involving a number of 'core data streams' that can be used free-of-charge for GFOI purposes.
2. A coordinated national data acquisition strategy in response to national needs assessments undertaken in the course of GFOI implementation.
3. Data supply in support of the FCT activities, including in support of: the science studies assisting the development and evolution of the GEO-branded methods and protocol documents for GFOI; interoperability studies; and validation activities.

The baseline global data acquisition strategy for CEOS will involve coordination of a number of core data streams that satisfy key criteria consistent with the principles for implementation of the GFOI, and discussions among CEOS agencies active within the FCT task for the last several years have resulted in consensus on a working list of CEOS agency satellite missions assumed to represent the GFOI core satellite data streams. It was noted that many more CEOS agency missions will be able to contribute to systematic regional, national, and/or global coverage.



Hervé Jeanjean (EC) reported that the Sentinels data policy remains under discussion between EC and ESA but they are hopeful of being able to support the GFOI. The Sentinels data policy is to be approved at the EU level by the relevant institutions.

Stephen Briggs confirmed that ESA endorses the data strategy, and the activity of the proposed GFOI Space Data Coordination Group (SDCG) as a continuation of the current work of CEOS. It reflects the priorities expressed by José Achache and addresses the institutional arrangements and capacity building needs. Mike Freilich requested a refinement to the SDCG objectives, recognising that CEOS should not accept open-ended assignments related to operations. The data coordination efforts should be charged with establishing a transition to a global scale endeavour and the proposal for the long-term acquisition strategy. There is a great deal more to GFOI than FCT – whereas FCT was more focused on data acquisition and in some cases provision, GFOI is capacity building, has financial aspects, and links to other international bodies.

Stephen Ward replied that this reflects the priorities for the next few years and it would be appropriate to review institutional arrangements after those few years, taking stock of contextual developments (e.g. climate negotiations, GFOI Project Office evolution etc.).

It was agreed that:

- Plenary endorses *The CEOS Strategy for Space Data Coverage and Continuity in Support of the GEO Global Forest Observations Initiative (GFOI) and Forest Carbon Tracking (FCT) Task*;
- Plenary agrees to establish the GFOI Space Data Coordination Group (SDCG);
- SDCG stakeholder agencies will explore management and operational arrangements;
- The SDCG will develop the GFOI Global Data Acquisition Strategy for 26th Plenary; and
- CEOS should remain aware of developments and arrangements within GEO and beyond for GFOI implementation and institutional arrangements, and ensure that adequate representation and connections exist between CEOS efforts and the anticipated GFOI Project Office. The role for CEOS and the SDCG will be reviewed in due course, reflecting these contextual developments and the recognition that CEOS is not the venue for handling long-term operations.

25-12	**Stakeholder agencies to explore management and operation arrangements for the GFOI Space Data Coordination Group**	**December 2011**
25-13	**GFOI Space Data Coordination Group to develop the GFOI Baseline Global Space Data Acquisition Strategy for 26th CEOS Plenary, including a year-by-year plan through to 2015**	**CEOS-26**

13 Confirming Support to Issues in the 2011 CEOS Work Plan

Tim Stryker reported on several areas of emerging interest from the 2011 CEOS Work Plan.

Initial support to the **Joint Experiments on Crop Assessment and Monitoring (JECAM)** initiative *(ref 2009-11 GEO Work Plan Task AG-07-03a)*.

- GEO Agricultural CoP inter-comparison of EO data, analysis techniques, monitoring methods and models; and
- Experimental data sets acquired for a limited set of experimental sites around the world.

Continued and expanded support to the **Geohazards Supersites and Natural Laboratories** initiative *(ref 2009-11 GEO Work Plan Task DI-09-01a)*.

- Programme of access to space borne EO and *in-situ* geophysical data of selected sites prone to earthquakes, volcanoes, or other hazards.

Water Cycle Integrator Initiative exploratory dialogue on potential CEOS contributions to enhanced conservation and informed in **water cycle management** *(ref 2009-11 GEO Work Plan Task WA-06-07)*.

- A top GEO priority, relating to water security, food security, natural hazards, sustainable development, and climate change impacts;
- Proposed strategic-level GEO Report for supporting the Water Cycle Integrator (WCI);
- Scoping team to consider closer water cycle-related cooperation;
- JAXA, NASA, and NOAA – other CEOS Agencies welcome;
- Early December teleconference with GEO task lead (Prof. Koike); and
- Report to SIT-27: CEOS Agencies' assessment of the need for a GEO Water Strategy Report, its approach, and the possible CEOS role therein.

Exploratory dialogue on potential CEOS contributions to the **GEO Biodiversity Observation Network** (*ref 2009-11 GEO Work Plan Task BI-07-01).*

- Observation capabilities assessment for UN CBD 2020 targets.

Several conclusions and recommendations were discussed, noting that supporting CEOS agencies recommend inclusion of all four activities in the 2012 CEOS Work Plan.

JECAM and Supersites: Relatively focused activities; dedicated CEOS Agency support and procedures for data access and utilization.

- Existing/pledged CEOS Agencies' support should ensure successful implementation at current scope of activity.

Water and Biodiversity: Larger and more complex, and at earlier stages of development, with a smaller base of CEOS-coordinated support (to date).

– Further definition/development required and recommended.

Stephen Briggs queried which observations are most needed in support of biodiversity. Martin Wegmann (DLR) noted that land surface imaging data is most needed, including hyperspectral data in support of habitat mapping. GEOBON will define specific remote sensing needs for different biodiversity issues.

Per Erik Skrovseth stated that he appreciates the Supersites initiative and informed all that a program is already in existence in Norway that tracks rockslides into fjords.

Dr. Sagesse stated that ASI is prepared to join the Supersites initiative and will provide approximately 30 COSMO-Skymed images for interferometry and Digital Elevation Models over Hawaii. He also noted that Italy has approximately 500 landslides per year, and that ASI was conducting a pilot program using C-S data for their analysis.

14 Consideration of CEOS Response to Recent Requests

GEO GLAM

Tim Stryker presented a summary of the **G20-GEO Global Agricultural Monitoring Initiative (GEO-GLAM)**, noting that it was launched at a June meeting of G20 Agriculture Ministers and endorsed by the recent G20 Heads of State meeting in Cannes. The system seeks to enhance national agricultural reporting systems; establish a sustained international network for research/monitoring; and, to create an operational global agricultural production monitoring system of systems from satellite and *in situ* observations. A GEO-GLAM meeting was held in September in Geneva, with 33 participants from 13 G20 members, and included experts from GEO, CEOS, FAO, and WMO; this meeting initiated the development of a detailed implementation plan.

As a part of this process, CEOS posed a number of questions to the GEO Agricultural CoP (Ag CoP):

1. What satellite-derived information products do you require/desire?
2. At what frequency should these information products be produced?
3. Who would receive these products, and how would they be used?
4. When would the product recipient(s) be ready to assimilate information products?
5. How would you want the products to be distributed (i.e. single web portal, direct delivery to national authorities, etc.)?
6. How would GEO GLAM-related funding occur for global data acquisition and provision, by government agencies and/or commercial entities?
7. Does GEO GLAM intend to make use of both free-of-charge and commercial data, and through what mechanisms?

The Ag CoP have provided a preliminary set of answers to these questions, and it is important to note that this is not a traditional "client-service provider" relationship; a dialogue is needed to determine what role CEOS could play. Four or five coverages are needed annually for GEO-GLAM needs and will require a significant effort, but with major anticipated societal benefits for food security and enhanced commodity market stability.

Gilberto Câmara thanked those involved for the progress so far in engaging with GEO-GLAM and recommended CEOS support to the initiative.

Polar Ecosystems

Guy Seguin presented the background of the **Arctic Ecosystems Initiative**, noting several of the issues and motivations:

- The Arctic is an area of the world where climate change impacts are most evident;
- There is growing pressure on its ecosystems; and
- There is a lack of knowledge about the area (measurements, monitoring, prediction, etc.).

This activity is linked to the 2012-2015 GEO Work Plan through Task EC-01, Component C2 *Operational Monitoring of Key Ecosystems and Related Services*. The group is seeking involvement of CEOS agencies with interests in Arctic Ecosystems for the following tasks:

- Implement a user needs assessment and iterative consultation process with key Arctic ecosystem stakeholders;
- Develop a foreground observation strategy for Arctic ecosystems (modulated against agency and mission capabilities) in line with the overarching science requirements – to be developed and implemented under the framework of **Polar Space Task Group**; and
- Develop a cooperative contribution framework in support of the development of space-based information products.

A number of key linkages have been identified, including: the Arctic cooperation and policy framework; WMO polar activities; other GEO SBAs (i.e. Ecosystems, BON); and, Canadian activities such as Canada's Northern Strategy, and ArcticNet.

This activity will look at how to better coordinate the effective use of available satellite-based Earth observations. A high-level implementation plan would be developed within six months; and a sub-task issues document and science plan would be generated by the end of the first year. This would be followed by the identification of current and potential implementation projects, a series of workshops and meetings focused on enhanced coordination during the 2nd and 3rd years, and a final Symposium at the end of year 3.

Plenary suggested that this activity could be coordinated under the CEOS Ecosystems SBA.

15 CEOS Contribution to Disaster Management

Stephen Briggs noted the long history of space agency initiatives in relation to disasters and the various phases of the risk management cycle. He suggested there is an uneven distribution of attention by space agencies across that cycle. Activities include: the Disasters Charter (with 50 activations per year of late); Sentinel Asia; SERVIR; GMES Emergency Management Services; UN-SPIDER, etc. 'Disasters' is also one of the nine SBAs of GEO. ESA is encouraging a look at a more effective CEOS contribution, by assessing gaps, overlaps and consideration of the balance of effort. This could be achieved by a focussed discussion of those agencies that are investing resources in the current disaster-related activities – reporting to a future CEOS meeting on the recommended way forward. Subsequently, a report will be prepared for next year which summarises on-going actions and identifies any future complementary initiative. Two meetings are planned in 2012 among interested CEOS Agencies. Potential agencies include CSA, CNES, DLR, NASA, JAXA, ISRO. Following the finalisation of this report and its presentation to 2012 SIT/Plenary ESA will propose any further initiative required.

Brent Smith reported that this proposal is similar, with respect to intent, to the CEOS Disaster Management Task Force that attempted to provide some focus for disaster activities for three years during the 1990's. Stephen agreed that this is not a new activity for CEOS, but that it represents an attempt to improve the coordination and communication between existing on-going efforts.

16 Working Groups: 2010 Report and Actions

WGISS Pakorn Apaphant presented a summary of 2011 highlights.

The CWIC service offers access to operational inventory systems at NOAA CLASS, NASA ECHO, USGS, INPE, and working on connection to AOE (China – NSMC, Beijing-1);

- All metadata records held in the CEOS IDN collection are available to the GCI;
- Atmospheric Composition Portal is available at http://wdc.dlr.de/acp/;
- CEOS Water Portal is available at http://waterportal.ceos.org; and
- Data Stewardship including the CEOS WGISS Purge Alert Service, and white papers on Long-Term Archive Strategies; Data Preservation Techniques; Data Lifecycle Models and Concepts; Browse Survey 1997-2010; Guidelines for GIS-Ready Products; and, Revised WGISS five year plan.

Pakorn noted that agency representation to WGISS has been declining for some years, and encouraged participation, especially from Asian and European agencies. A nomination for WGISS Vice Chair is urgently needed to ensure continuity in leadership. As of this Plenary, Pakorn ended his term as WGISS Chair and was thanked for his contributions to WGISS. Satoko Muira (JAXA) assumed WGISS Chair responsibilities. The Vice Chair remains vacant.

25-14	**CEOS agencies to consider providing nominations for a Vice Chair for WGISS**	**SIT-27**
25-15	**CEOS Chair to write to CEOS agencies outlining the WGISS Work Plan and objectives for the coming years and inviting representation from CEOS agencies not currently active**	**December 2011**

Future WGISS meetings will take place as follows:

- WGISS-33: Tsukuba, Japan, 23rd-27th April 2012; and
- WGISS-34: India, August 2012 (Joint meeting with WGCV).

Plenary was asked to endorse the revised WGISS five year plan - and this was endorsed.

WGCV Greg Stensaas (USGS) presented a summary of recent and near future meetings.

- WGCV-33: Moscow, Russia, 16th-20th May 2011, hosted by ROSCOSMOS;
- WGCV-34: Brisbane, Australia, 6th-10th February 2012, hosted by TERN-AusCover; and
- WGCV-35: India, September 2012, hosted by ISRO.

The WGCV is supported by six subgroups representing key communities or domains, and Greg summarised a number of requests and recommendations from these subgroups:

- Strong need for agency support for ground networks and field campaigns to support new missions;

- Two new thematic groups (Geo-spatial quality and Geo-image quality) have been established within the WGCV's Infrared, Visible, and Optical Subgroup (IVOS). Agencies are encouraged to participate;
- Strong need to continue and enhance the Cal/Val Portal as a community resource;
- Agency support in maintaining instrumentation at the cal/val test sites, and acquiring data routinely over them, is imperative;
- Agency support is requested for a detailed CEOS cross-comparison activity at Antarctica DOME-C in December 2011/January 2012. Support required in acquiring data over the site and in contributing to a manned activity measuring surface BRDF at DOME-C; and
- WGCV's Microwave Subgroup (MWS) welcomes new members from interested member agencies and requests agency support in developing and enhancing QA processes for microwave observations.

WGCV is co-lead (with IEEE) on GEO task DA-09-01a (GEOSS Quality Assurance Strategy), and is currently working on six specific task actions (as reported at the SIT Workshop in September 2011). In particular, the current version of QA4EO is in active use (http://www.qa4eo.org), and is now beginning to be implemented within CEOS and throughout GEO. A GEO QA4EO Workshop was held 18th-20th October 2011, hosted by RAL-Space in Harwell, UK.

Per Plenary action 24-12, CEOS member agencies are requested to provide support to the implementation of QA4EO; no more USGS resources are currently available to continue to support the QA4EO secretariat and website activities.

25-16	**CEOS Agencies encouraged to consider taking on responsibility for QA4EO secretariat and website maintenance**	**SIT-27**

In response to Plenary action 24-13, the CEOS-recommended Cal/Val sites and processes are available on the Cal/Val portal. WGCV requests that CEOS member agencies routinely acquire data over these sites and support the maintenance of any instrumentation required on site.

Greg shared several other WGCV recommendations for CEOS agencies to consider:

- Nominating representatives to join and support the WGCV and its subgroups;
- Nominating candidates for WGCV Vice Chair (2012-14), to become WGCV Chair (2014-2016);
- Cross-organization funding and support for international field campaigns, including support for the 2011/12 DOME-C campaign; and
- Supporting calibration missions such as the Traceable Radiometry Underpinning Terrestrial- and Helio-Studies (TRUTHS) and the Climate Absolute Radiance and Refractivity Observatory (CLARREO) missions.

17 CEOS Executive Officer Report

Tim Stryker and Kerry Sawyer (DCEO) provided a summary of CEO/DCEO activities. Their general responsibilities include: supporting achievement and coordination of CEOS objectives; advising on key CEOS issues; and, assisting CEOS in coordination with external stakeholders (i.e. GEO). Tim showed the specific delineation of CEOS work responsibilities (liaison, etc.) between Kerry and himself.

Much support has been provided by CEO/DCEO to the execution of the 2009-2011 GEO Work Plan, as well as the development of the 2012-2015 Plan. This included:

- GEO Ministerial and VII Plenary support, and December 2011 coordination and follow-up;
- CEOS-GEO Actions coordination in the lead-up to, and planning of, the CEOS-GEO Actions Workshop in February 2011;
- Support to the migration of task information to the online CEOS Actions tracking system; and
- Extensive consultation with CEOS Members and leadership, as well as GEO, on the development of and CEOS contributions to the 2012-2015 GEO Work Plan.

The GEO 2012-2015 Work Plan has significant CEOS involvement and leadership, and points of contact have been confirmed. CEOS will lead or co-lead 19, around one third, of the Task Components in the new Plan.

Consultations with other key external stakeholders in 2011 have included extensive dialogue with GCOS, WCRP, and the WMO Space Programme, as well as responses to a number of external information requests, and guidance to potential new CEOS Members.

The CEO/DCEO plans for 2012 include:

- Update the CEOS Implementation Plan (by end 2011);
- Continuity of effort across all major lines of activity (external and internal);
- Support enhanced strategic focus of key CEOS leadership meetings and related long-term priorities;
- Maintain strong CEOS support to GEO under its new Work Plan;
- Support implementation of priority CEOS Self-Study recommendations; and
- Maintain insight into key CEOS community needs, and assist as capacity allows.

Tim offered the following observations on CEO activities for 2011:

- Continued complex and time-intensive internal and external coordination; and
- Much heavier workload than first anticipated, despite having two people involved in the role.

Tim thanked Kerry and the CEOS community for their excellent interactions and work across all CEOS activities in 2011. Enrico Saggese thanked NOAA and USGS for providing high quality staff in support of the CEO function.

18 CEOS Systems Engineering Office Report

Brian Killough reported the 2011 accomplishments of the SEO:

- Led the CEOS-GEO **Portal Study;**
- Member of the CEOS **Self Study** Steering Team;
- Continued support of the CEOS **MIM Database;**
- Worked closely with the ESA team on MIM design and content review;
- Completed the Land Surface Imaging (**LSI**) Mid-resolution Optical **Standards Document**;
- Added new features to the SEO **Systems Database** to support ISU Student Projects, Orbit Conjunction Assessments, Flood Disasters, and Climate Data Records (for WGClimate);
- Developed a **Data Acquisition Planning** template for JECAM and conducted COVE assessments for two South America test sites;
- Coordinated and staffed the annual **CEOS booth** at the GEO-VII meeting;

- Added new missions and features to the **COVE** tool. Continue to expand user base and support of CEOS initiatives;
- Supported agency **communications** by maintaining the CEOS website content and mailing lists, and utilizing the new Action Tracking Tool; and
- The **COVE tool**, developed by the SEO offers an innovative and effective solution.

Brian noted that several projects were supported by COVE:

- Namibia, Africa Floods – Prototype Disaster Response Study (**April 2011**);
- CEOS Working Group on Calibration and Validation (WGCV) annual campaigns (Toz Golu in **August 2011**, DOME-C in **December 2011**); and
- Data Acquisition Planning for GEO initiatives: Agriculture (JECAM) **Sept 2011;** and, FCT and GFOI – **future**.

Brian report that 2012 plans for the SEO include:

- Continue to support completion of the CEOS **Self Study** report;
- Support Carbon Task Force (**CTF**) by completing gap assessments of carbon parameters in atmosphere, ocean and land domains;
- Support **WGClimate** by developing a Climate Data Record (CDR) database and supporting climate architecture development;
- Support **Disasters** SBA team by conducting gap assessments for floods and other critical disaster events;
- Support **WGCV** ground validation campaigns by utilizing COVE to develop data acquisition plans;
- Support **JECAM, FCT/GFOI and Supersites** initiatives by utilizing COVE tool to develop data acquisition planning strategies;
- Host several **meetings**: CEOS-GEO Actions Meeting (February), SIT-27 Meeting (March), SIT Workshop (TBD); and
- Host **CEOS booths** at Rio+20 Conference (June) and GEO-IX Meeting (November). Host COVE booth at IGARSS Conference (July).

19 2011 Edition of the CEOS MIM Database

Simonetta Cheli and Stephen Ward presented a summary of the CEOS Missions, Instruments and Measurements (MIM) database, noting that it is the only official consolidated statement of the programmes and plans of CEOS agencies, provides the data backbone for the CEOS Earth Observation Handbook, and is a cornerstone for CEOS coordination on gaps and overlaps to optimise global observations.

Highlights for 2011 include:

- A successful 2011 update survey, with thanks to the many agency contributions;
- Continued strong collaboration with the SEO, including: sharing information on VCs, ECVs, and SBAs; links to the COVE tool; and, collaboration on future directions;
- A review of the instrument-measurement mappings by the Virtual Constellations;
- A number of analysis enhancements to the online portal database.eohandbook.com; and
- A 26% increase in unique visitors to the database portal over the previous year.

Coordination efforts are ongoing with WGClimate in an effort to unify annual survey processes, and to optimise integration of information between databases. These discussions remain preliminary, and the MIM team is ready to be responsive in support of this important activity.

A print edition of the CEOS Earth Observation Handbook will be prepared for launch at Rio+20. While the format and content are currently under study, this edition will highlight CEOS support to the relevant conventions and Rio+20 main themes. Inputs will be sought from the CEOS community, including a mini MIM update cycle.

A full update will also be planned for 2012, as well as continued enhancement of content, consistency, user engagement, and utilities to facilitate analysis.

Stefano Bruzzi thanked ESA for this contribution.

20 Climate Monitoring Architecture

Stefano Bruzzi gave an overview of the heritage and context to the Writing Group on the Architecture for Climate Monitoring from Space. He explained the running order and contents for the various presentations – noting the absence of WCRP from the meeting.

Mark Dowell presented the report of the writing group on Architecture for Climate Monitoring from Space. A WMO/GCOS-hosted meeting in January 2011 agreed to develop a strategy for climate monitoring architecture, and as a first step, a writing group (CEOS 4/5; CGMS 4/5; WMO 2) and a review group (GEO; GCOS; WCRP) were identified. This activity has been conducted as a 'badge-less' effort, with the aim of producing a strategy for developing the architecture, and a draft due end of August 2011. The timeline of events was presented.

- April – Drafts of extended chapter outlines to be sent to Mark Dowell;
- May– First draft of entire extended outline to be sent to Writing Team for review;
- June – First draft of individual chapters to be sent to Mark; revised complete draft sent to Writing Team;
- July – Writing team to provide feedback for second draft of report, including formatting;
- August – Report sent to review group;
- September – Comments due on report from review group; and
- Mid September – final report sent to CEOS and CGMS.

The draft report outline includes:

- An Executive Summary, Introduction, objectives and targets;
- Climate monitoring principles, requirements and guidelines;
- Current state of the art; beyond research to operations;
- Climate Architecture definition;
- Mechanisms for interaction; and
- Roadmap for way forward and recommendations.

The approach adopted is intentionally open and inclusive, and has been designed so that all the relevant entities can identify their potential contributions. This recognises the need to obtain the maximum degree of consensus at this early stage in the process, given that the level of definition of the architecture is necessarily high-level and conceptual. The report considers climate monitoring principles, requirements and guidelines, takes into account the heritage of previous satellite missions, as well as current and future missions, and considers gap analyses of satellite missions compared with GCOS requirements for ECVs. The report also takes a holistic view of

the interdependency of research and operations needed for sustained and routine climate monitoring.

The proposed architecture consists of two parts: a generic (ECV-independent) logical architecture that represents the functional components of the assumed requirements baseline (based on GCOS documentation); and, a companion physical architecture that is designed to capture the current and planned physical implementation arrangements on an ECV-by-ECV basis. In the short term (~2 years) the approach will be defined and validated, and a consensus will be sought on overall approach. At the end of this period, implementation arrangements will be described within a physical architecture. In the medium term (2-4 years) the physical architecture will be used to develop a coordinated action plan to address identified gaps and shortfalls.

Comments have been received from GCOS and WCRP on the draft so far, which have been largely complimentary, but have flagged some specific comments and concerns.

CEOS and CEOS Members are asked to provide comments by the end of November. Ideally these would be in the form of a consolidated set of CEOS comments.

Alain Ratier (EUMETSAT) noted that the Report had been presented to the recent CGMS meeting, and the reception was very positive concerning the approach and outcomes. CGMS commented that the re-analysis community requirements should also be reflected.

Rich Eckman (NASA) asked for clarification on the main audience and purpose for the Report. Mark referred to the table in the Report on 'use cases'. Stefano Bruzzi stressed the importance of this not being a theoretical exercise, and we should make sure the concrete steps forward are realised. Alain referred to the logical architecture chart – suggesting that adaptation and mitigation planning may not be properly characterised, which should be considered as decision-making. Mark responded that this comment had been made by others and would be reflected in updating the draft. He noted that the next immediate step is to map various case studies to ensure the logical architecture is practical in application.

Stephen Briggs thanked the writing team for their efforts - which they have executed extremely well. He welcomed the recognition of increased contribution from both research and operational agencies. He suggested that perhaps the likes of ECMWF could well represent the requirements of the re-analysis community. Barbara Ryan added her thanks to the writing team. She noted that the WMO Congress had welcomed broader input to the exercise, beyond the space observations community.

Stefano and Mark asked for further comments on the draft, the way forward, and the evolution of the ad-hoc group by the end of November.

25-17	**CEOS Chair to coordinate input of consolidated CEOS comments on the Climate Architecture Report**	**30 November 2011**

21 Developments within the Global Climate Observing System (GCOS)

Carolin Richter (GCOS) presented a summary of recent GCOS activities, including the 2010 update to the GCOS Implementation Plan (IP). The 2010 update was released in August 2010 after an open review, builds on the 2004 plan, and was welcomed by the UNFCCC SBSTA meeting in Cancun in December 2010. The draft Supplement on Satellite Data Products is currently being developed, with completion planned for December 2011. Future activities include: execution of the core program; review of data needs for adaptation and service provision

(2012-2013); assessment of progress and adequacy (2014-2015); and, a new Implementation Plan (2015-2016).

GCOS GLOBAL CLIMATE OBSERVING SYSTEM

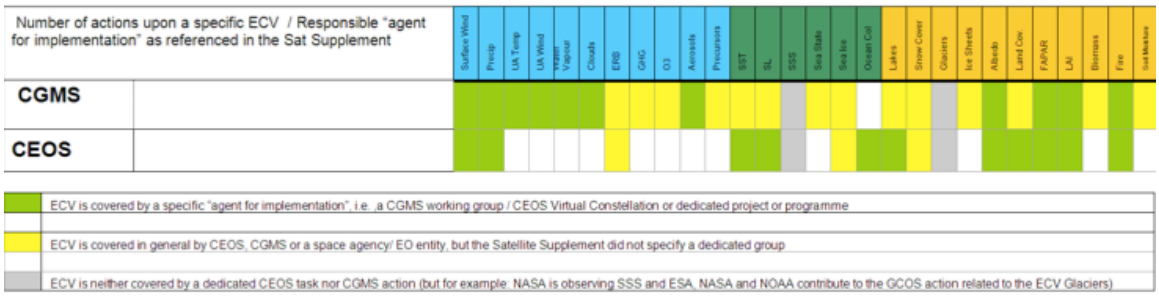
Essential Climate Variable

ECVs for which satellite observations make a significant contribution

(Source: *Draft* Satellite Supplement to the in 2010 updated GCOS Implementation Plan)

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	Surface wind speed and direction, Precipitation, Upper-air temperature, Upper-air wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance), Carbon dioxide, Methane, and other long-lived greenhouse gases, Ozone and Aerosol properties, supported by their precursors.
Oceanic	Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Ocean colour.
Terrestrial	Lakes, Snow cover, Glaciers and ice caps, Ice sheets, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Above-ground biomass, Fire disturbance, Soil moisture.

The actors identified for each of these ECVs were summarised as:



Carolin shared several recommendations for CEOS to consider:

1) CEOS Members to ensure the implementation of the tasks implied in the (December) 2011 update of supplemental details to the satellite based component of the 2010 updated GCOS implementation plan. The updated Satellite Supplement will be submitted to SBSTA-36 by GCOS in 2012.
2) CEOS Members to support any follow-up on initiatives with regard to the evaluation of GCOS ECV data sets.
3) CEOS members to continue to closely cooperate with GCOS on future progress reports with regard to the actions of the Implementation Plan and on reviewing the adequacy of observing systems for climate.
4) Space agencies, national meteorological and hydrological services, and operational marine services support *the improvement of in situ networks* through all domains (atmosphere, ocean and land), needed for validation and ground truth for space based observations.
5) CEOS members to take part in future regional workshops and assist in encouraging regional cooperation at those meetings. Carolin reminded CEOS about the heritage of the GCOS regional workshops.

Table 1. Regional Workshop Programme Schedule				
Region	**Location of Regional Workshop**	**Date**	**Location of Action Plan Meeting**	**Date**
Pacific Islands	Apia, Samoa	August 2000	Honolulu, Hawaii	October 2001
Eastern and Southern Africa	Kisumu, Kenya	October 2001	Nairobi, Kenya	January 2002
Central America and the Caribbean	San José, Costa Rica	March 2002	Bridgetown, Barbados	May 2002
East and Southeast Asia	Singapore, Singapore	September 2002	Beijing, China	March 2003
Western and Central Africa	Niamey, Niger	March 2003	Dakar, Senegal	September 2003
South America	Santiago, Chile	October 2003	Buenos Aires, Argentina	April 2004
Central Asia	Almaty, Kazakhstan	May 2004	Yerevan, Armenia	September 2004
South and Southwest Asia	New Delhi, India	October 2004	Isfahan, Iran	May 2005
Eastern and Central Europe	Leipzig, Germany	April 2005	Ljubljana, Slovenia	September 2005
Mediterranean Basin	Marrakech, Morocco	November 2005	Tunis, Tunisia	May 2006

Stefano Bruzzi asked whether GCOS is specifically seeking more interaction with CEOS – in addition to the GCOS IP relationship. Carolin confirmed that this is the case and hoped that CEOS could engage more in the initiatives relating to actions – beyond the reporting to UNFCCC.

Mark Dowell noted some conflicting feedback on the Architecture Report on the role of GCOS requirements in relation to the Global Framework for Climate Services (which covers regional and local scales too). Adrian Simmons had indicated that the GCOS requirements are expected to evolve to cover these scales in future. On the CEOS-CGMS table, Mark cautioned that such analyses could give over-optimistic impressions that GCOS requirements are being met.

Carolin confirmed that GCOS requirements would be expanded and updated to include scales other than global in future. She noted that the CEOS-CGMS was a very high level indication of which group takes care of which parameters, in very broad terms.

22 CEOS Response to the Updated GCOS IP and Satellite Supplement

Mitch Goldberg (NOAA) presented a status update on the CEOS Response to the Updated GCOS Implementation Plan (IP) and Satellite Supplement, noting that the response is due for the December 2012 meeting of UNFCCC. The 2010 edition of the IP (IP-10) replaces a similarly titled Plan (IP-04), published in 2004. Its purpose is to provide an updated set of actions required to implement and maintain a comprehensive global observing system for climate that will address the commitments of the Parties under Articles 4 and 5 of the UNFCCC and support their needs for climate observations in fulfilment of the objectives of the Convention.

This also includes the Satellite Supplement which provides supplemental detail including: products; target requirements; rationale; currently achievable performance; requirements for satellite instruments and data; calibration, validation and archiving needs; adequacy and inadequacy of current holdings; and, immediate actions, partnerships and international coordination. The CEOS response reinforces the needs called out by the GCOS Satellite Supplement, and can include additional activities not called out by GCOS but may be considered important by CEOS.

CEOS has 47 Actions to respond to, and in formulating this response has identified domain leads for atmosphere, ocean, and terrestrial. The response is being coordinated with CEOS Working Groups and Virtual Constellations, as well as external groups like SCOPE-CM, GSICS, WCRP, and CGMS. The group has also identified about three subject matter experts for each GCOS IP action to develop the response via a common template. The goal was to have 70% of these templates completed in November (currently 72% complete), and 100% complete in February 2012. The goal for the report is to have a draft by April 2012, and to have it finalized by September 2012.

Mitch proposed the organisation of a workshop to finalise the document, and noted that the next WGClimate will be in the U.S. in April and this may be an opportunity.

Gilberto Câmara noted the significant effort within CEOS in relation to Climate, and queried whether there is still the same need for CGMS to do the same. Barbara Ryan noted that she had worked with both CEOS and CGMS and believes the groups have very different approaches and scope. She noted some improved efficiency through the Architecture group, and added that some CGMS members (like JMA and KMA) are not active CEOS Members. Mary Kicza suggested that the both CEOS and CGMS offered unique perspectives.

23 1st Year of the Working Group on Climate

Mark Dowell presented a summary of the first year of WGClimate activities, noting that the group was confirmed as a full CEOS Working Group at 24th CEOS Plenary. The first full meeting of the group was held in conjunction with SIT-26 in Frascati in May. Almost all members were able to participate in that meeting, and there was also good involvement from other SIT participants. Most recently, a small group also met at the WCRP Open Science Conference in October in Denver. The initial priorities for WGClimate are:

- CEOS ECV Inventory;
- Climate Monitoring Architecture;
- ECV by ECV analysis and assessment; and
- Outreach/Networking: with other CEOS WGs and VCs, and external (i.e. SCOPE-CM/GSICS, WCRP).

Mark reviewed the drivers for a Climate Monitoring Architecture, including: promotion of a common understanding of implementation implications; assessment of the degree to which currently implemented systems meet requirements; and, understand end-to-end information flows and dependencies. He also noted that the ECV inventory will need to be harmonised with the GCOS guidelines and GCMP, the logical architecture, and include a maturity index, and will also need to be aligned with existing MIM information requests.

Mark noted three issues for CEOS consideration:

1) **ECV Assessments:** is there a need for these to be independent? There is a strong case for collaboration with WCRP, and also with CEOS VCs and WGCV. This level of coordination will require resources.
2) **Role of CEOS Constellations:** focus will be on VCs where implementation of an ECV record is a fundamental to their objectives. The SST-VC will be a pilot for this kind of end-to-end assessment. Not all VCs were created with ECV coordination work in mind and this will need attention – as will resourcing of this new load on VC teams.
3) **Inventory and MIM:** WGClimate can definitely benefit from the CEOS MIM information call, though there is an urgent need to generate a template for the WGClimate call (also

required for the physical architecture). There are ongoing discussions on whether the information should be re-integrated with the MIM.

There are different activities underway in WCRP (e.g., GEWEX and WOAP) which are compatible with WGClimate priorities and it may be worth having their lead (e.g., on assessments).

Mary Kicza asked about the relationship with WCRP and how *in situ* measurements are addressed, and Mark replied that there has been no serious consideration as yet within the CEOS WGClimate efforts. Stephen Briggs noted that this also relates to the 4th recommendation of GCOS. Carolin Richter confirmed that *in situ* observations are high on GCOS priorities. Stephen asked whether there should be an *in situ* supplement to the GCOS IP as well as a satellite supplement – covering for example new measurements such as soil carbon.

Stefano Bruzzi concluded the session – reminding that comments are due on the Climate Architecture report. He recalled the GCOS recommendations and the linkages through the work of the Climate SBA and WGClimate. He proposed that CEOS endorse the way forward proposed for the WGClimate, including the SST-VC pilot activity. This will require additional resources in the VC teams.

José Achache remarked on the Lucca Statement *[see Appendix 2]*, as presented by Stefano Bruzzi, and noted the email comments expressing reservations regarding the GEO Data Sharing Principles. He reminded participants that the relevant GEO Member Governments have already endorsed these Principles.

25-18	**WGClimate and SST-VC to undertake a pilot effort in 2012 to demonstrate the approach and benefits of the contribution of the CEOS Constellations to ECV coordination – and to report to CEOS-26 with a progress statement and recommendations**	**CEOS-26**
25-19	**WGClimate to coordinate with the ESA MIM team to determine how best to integrate the ECV survey process into the full 2012 MIM update**	**May 2012**
25-20	**WGClimate to report on their initial progress towards the CEOS ECV inventory and assessments**	**CEOS-26**

24 CEOS Self-Study Preliminary Findings

Mike Freilich recalled the motivation behind NASA's proposal for and leadership of a Self Study process for CEOS in 2011. The objectives were to: identify and evaluate CEOS successes and strengths in achieving real coordination in space-based Earth observations for societal benefit; identify CEOS challenges and areas needing improvement; identify potential new CEOS initiatives for the next 3-5 years. The CEOS Self Study (CSS) process also served a purpose in team building and engagement of many in the CEOS community.

Patricia Jacobberger-Jellison (NASA) thanked all contributors to the CEOS Self Study. The Study was overseen by a Steering Committee and contributed to by three study teams (on Executive Functions, Working Groups and SBAs, and Virtual Constellations).

Four major sources of material were developed over the course of the CEOS Self Study. These include the three Study Team Reports (on Executive Functions; Working Groups and SBAs; and Virtual Constellations) together with the report compiled through interviews with past CEOS leaders. Taken together, these reports compiled by the CSS Steering Committee and Study Teams represent the collective and individual opinions of nearly 80 individuals with a substantial history of involvement and leadership in CEOS.

Once this material was gathered, the major findings and recommendations from the three Study Team reports and the interviews of past CEOS Leaders were collated into a Synthesis Report, which includes 13 findings and 15 recommendations.

There was remarkable consonance among the findings and recommendations derived from study team reports and leadership interviews. In broad terms, five themes dominate the results, and the highest-level recommendations can be characterized in terms of these five themes:

- **CEOS Strategic Objectives Key Recommendation:** Develop a 5-year CEOS Strategic Plan highlighting goals and objectives of the organization. The Strategic Plan should be accompanied by appropriate Work Plans to ensure progress toward established goals, and should not only consider GEO Work Plan goals, but overall CEOS goals as well.
- **Decision-making and New Initiatives Key Recommendation:** Develop a process for reviewing and selecting new activities with consideration for CEOS objectives and available resources, The CSS results suggest that an increased focus on hazards and disaster monitoring and response could serve as the first proposed initiative to be evaluated for consideration under the new process.
- **Organizational Functions Key Recommendation:** Explicitly articulate the organizational functions and relationships that CEOS needs in order to perform and sustain its work, and consider whether modification of the leadership structure, organizational elements, and connections are needed to support these functions. Terms of Reference for the CEOS Chair, SIT Chair, CEO, DCEO, SEO, Secretariat (SEC), Working Groups, Virtual Constellations and SBA Coordinators should be created/updated and made accessible, so that CEOS participants have a common understanding of these roles and responsibilities and the interfaces among them.
- **Membership and Participation Key Recommendation:** Develop a process for review, acceptance of new CEOS Members or Associates. Consider ways to encourage new Member engagement at all levels and develop a plan to follow up with and address concerns regarding inactive Members and Associates.
- **Objectives of Meetings Key Recommendation:** Develop coordinated objectives and formats for the CEOS Plenary meeting, SIT meeting(s), and SEC telecons to encourage discussion and decision-making. Balance reporting with strategic discussions that engage and utilize participation from all CEOS functional groups. Key meetings should be organized and conducted to allow communication and consideration of the Constellations and Working Groups.

These five Key Recommendations encapsulate the major themes of findings and individual recommendations in the body of the report. The Study Team will finalise the report in the coming weeks.

Mike noted the broad range of issues raised by the Self Study. He presented preliminary ideas on the implementation of the recommendations:

- CEOS is a productive, active, important, and strong organization – demonstrated by the act of carrying out the Self-Study, and by the Study's insightful findings and recommendations;

- CEOS's ongoing and substantive coordination, scientific, and applications-/user-focused activities cannot - and will not - be curtailed as we address Self-Study recommendations;
- While implementation of important Self-Study recommendations will likely lead to refocusing and refinement of responsibilities among CEOS sub-organizations, all such recommendations will be placed before the existing CEOS Plenary for concurrence; and
- The organizational and process changes arising from the Self-Study will be accomplished by November, 2013.

On membership and participation issues, Mike suggested that we must focus on engaging, educating, and evaluating members, especially those who are new or participating at a sub-optimal level. He suggested that the idea of a probationary period for new Members is not consistent with a voluntary body.

He proposed that CEOS leadership (Plenary and SIT chairs, CEO/DCEO) should appoint an ad hoc task group to address this issue, with the group's report due for consideration/adoption at the SIT-27 meeting in March 2012.

25-21	**SIT Chair, in coordination with CEOS SEC, appoint an ad-hoc Task Group on CEOS Participation, to report to SIT-27**	**Appoint Group: 15 December 2011** **Report: SIT-27**
25-22	**CEOS Chair, in coordination with CEOS SEC, to develop discussion and recommendations for CEOS Plenary, around the Membership issues raised by the CEOS Self Study**	**CEOS-26**

On meeting objectives, until otherwise approved by the CEOS Plenary, the CEOS Plenary Chair (Plenary, SEC meetings) and SIT Chair (SIT meeting, workshop(s)) are responsible for establishing and communicating clear, effective agendas following the lead of the 2011 Plenary. Mike suggested that more two-way communication is needed with the various subsidiary groups.

On organisational functions and clarifying roles and responsibilities, the Self Study recommendations regarding deficiencies in the current structure arise from a lack of specificity in the responsibilities of the present CEOS sub-organisations. We must assign responsibility for each of the 4 basic activities that span the range of CEOS endeavours:

- Substantive space-borne coordination, scientific, and user-focused activities ("CEOS Contributions/Accomplishments");
- Top-level strategy development;
- Internal CEOS coordination; and
- External CEOS coordination.

On a Strategic Plan, Decision-Making, New Initiative – Mike suggested proposing to produce three new guiding documents: a Work Plan (3-year longevity, updated annually); an Implementation Plan (5-7 year longevity – SIT Chair responsibility); and, a Strategic Guidance Document (10-12 year longevity – SIT Chair responsibility). He suggested that we cannot produce the Strategic Guidance Document in 2012, and that this should be done in 2013 after addressing some "Essential Questions":

- **Success:** What constitutes "Success" for each type of CEOS activity, and when will an activity end? CEOS cannot expand infinitely and needs to know when to hand on 'completed' initiatives; and
- **Scope:** to what extent should CEOS conduct sustained, long-term, routine data provision vs. demonstrating feasibility and generating a proposal to another organization as to how long-

term operations could be carried out? This may well involve the same agencies but not under the umbrella of CEOS.

Mike suggested that the CEOS leadership should assemble ad-hoc teams to address the above questions over the course of the coming year. NASA believes that the three basic documents can address many of the Self Study conclusions. He noted that CNES, has volunteered to be SIT Vice Chair, and has expressed interest in exploring possible organisational metrics.

Mike proposed an action for CEOS Agencies to send written comments on the Self Study to CEOS leadership within a month.

25-23	**CEOS agencies to send written comments on the Self Study outcomes and the proposed way forward to SIT Chair**	**9 December 2011**
25-24	**CEOS Chair, in coordination with CEOS SEC, to lead development of a CEOS Work Plan for 2012**	**31 January 2012**

He suggested the following steps for 2012 on the reaction to the Self Study:

- Continue to produce on existing CEOS substantive activities;
- Conduct Membership Task Force Study – implement resulting process;
- Continue, expand, and refine Meeting Objectives clarification and implementation;
- Address and answer "Essential Questions" (definition of success, scope of CEOS, etc.);
- Use utmost discipline to limit adoption of new CEOS substantive activities/objectives;
- Identify and task teams to write the 3 Guiding Documents; and
- Possibly initiate the Strategic Guidance Document.

And in the following year (2013):

- Continue to produce on existing CEOS substantive activities;
- Continue Membership Task Force implementation;
- Continue Meeting Objectives clarification and implementation; and
- Produce, evaluate, and adopt the three Guiding Documents.

As SIT Chair, NASA is willing to oversee and take responsibility for delivery of the various outcomes suggested for 2012 and 2013 – supported of course by the usual various contributors to CEOS.

Gilberto Câmara commended NASA on the significant effort – and noted that we need significant discussion time at Plenary, more than is apparent from the agenda now. Gilberto suggested that the Self Study neglects to address the duality between the CEOS Chair and SIT Chair roles. The rotation of CEOS Chair is well-distributed, but the SIT Chair role appears to be decided in private, without consulting all agencies having a heritage of significant contributions to CEOS.

Mike responded that a formalisation and democratisation of procedures would be part and parcel of the changes being proposed. He encouraged such comments to be made for inclusion in the final version of the CEOS Self Study Report. Mike anticipated that Gilberto's concerns will be fully addressed.

Barbara Ryan thanked contributors to the Self Study. She suggested that the Report could perhaps refer more to external coordination context and the various roles and responsibilities. The context was different when SIT was first formed and the changes might impact the leadership and construct of SIT. She noted that the drop in Associate attendance may be for positive reasons, including the success of GEO – and this should be characterised appropriately.

Ruth Boumphrey (UKSA) supported the request of INPE to allow adequate discussion time at CEOS Plenary. She noted the importance of CEOS efforts to smaller agencies such as UKSA and CEOS needs to consider how to engage and involve smaller agencies. The Self Study might help UKSA make the case for more CEOS engagement.

Per-Erik Skrovseth welcomed the Self Study Report as bringing strategic clarity to all CEOS endeavours. He suggested that the INPE comment could be considered as being addressed in the way forward proposed by NASA.

Stephen Briggs congratulated the Study Team and suggested that the structure of the Report is excellent. The long-term document could be the responsibility of the Troika. The external coordination may be handled by multiple actors and not over simplified. Two-way dialogue with WGs and VCs is essential and time needs to be allowed for it. There must be an emphasis on reports to SIT and Plenary meetings on those matters requiring decision. Stephen suggested that the Report does not address the CEOS SEC functions adequately. Nor is GEO adequately addressed or the possibility of changes in GEO that may be ahead. We should perhaps also address how CEOS might like to influence change in GEO, and how we should be represented. Patricia suggested that external coordination interfaces would be a matter for more detailed study in 2012.

Mike recalled the proposed way forward on the Self Study, noting that SIT-27 will discuss implementation but agencies will be provided with sufficient notice to review the key papers, and CEOS SEC will keep the community updated. He hoped that CEOS might limit the adoption of substantive new initiatives, pending agreement of a new process for reviewing and deciding which proposals to adopt.

25-25	**SIT Chair to lead development of the White Paper on CEOS "Essential Questions" suggested by the Self Study**	**SIT-27**
25-26	**SIT Chair, in coordination with CEOS Chair and SEC, to initiate planning and development of the CEOS Guiding Documents (Strategic Guidance; Implementation Plan; 3-year Work Plan) suggested by the Self Study**	**Teams established: CEOS-26 Documents complete: CEOS-27**

SIT Vice Chair Discussion

Gilberto repeated his concern over the lack of transparent procedures for the appointment of a new SIT Chair, noting this is something that needs to be taken into account. He proposed that we refrain from nominating the next SIT Chair until suitable formal procedures are in place and agreed. It would be four years before these could be brought into effect if not implemented now and a Chair is nominated for 2013-2014 without such procedures. Stefano suggested that this not be embedded in the Self Study next steps but that an action be imposed on the incoming CEOS Chair and SIT Chair for rapid development of rules for the nomination and approval of SIT Chair – to be endorsed at the Plenary in 2012, and to be applied to the process for SIT Chair following NASA. Progress can be reported to SIT-27.

Brent Smith (NOAA) suggested we look at the historical documentation around SIT and there may be some minutes from that time that may inform the discussion. Gilberto referred to the SIT Terms of Reference as saying "The SIT Chairman will be elected by the CEOS Plenary for a two-year term." Klaus Schmidt (DLR) noted that all of the Terms of Reference on the CEOS website are out of date and that the proposed way forward on the Self Study would address this.

Stephen Briggs referred to the relevant paragraph in the current SIT Terms of Reference:

The SIT Chairman will be elected by the CEOS Plenary for a two-year term. The SIT Chairman will be a senior space agency official, from a different agency than the CEOS Chairman. A SIT Vice-Chairman should also be elected, ideally for a term concurrent with the SIT Chairman, and shall succeed the Chair after the two-year term. The Vice- Chairman role is intended to provide active support to the SIT Chairman. Both the SIT Chairman and Vice-Chairman will be members of the CEOS Secretariat. SIT will be supported by the CEOS Secretariat.

Klaus suggested that there would be no problem in delaying nominations for a few months. Brent noted that CEOS Terms of Reference have not changed of late and we should study these as appropriate.

Stefano suggested that an action be given to the incoming CEOS Chair to convene a short CEOS Plenary session at SIT-27 to appoint a SIT Vice Chair for 2012-13, and this was agreed.

25-27	**CEOS Chair will convene a short CEOS Plenary session at SIT-27 in order to elect a Vice Chair for 2012-2013 for SIT**	**SIT-27**

Pascale Ultré-Guérard accepted the conclusion of the discussion and confirmed that, whether she is confirmed as Vice Chair for SIT or not, she remains ready to assist SIT Chair with the considerable work ahead.

25 Emerging Initiatives

A brief discussion on emerging initiatives agreed that the GCI and Geohazards Supersites and Natural Laboratories topics were confirmed as ongoing. It was noted that JECAM, disasters, water and biodiversity are more exploratory. Stefano noted that that this maturity is also reflected in the requirements articulated by these activities (e.g., Supersites and JECAM). There have been some discussions on water, but they have not been reported directly to Plenary, and should be reported to the next SIT meeting. The same is true for biodiversity, which needs to be progressed. GEO-GLAM and Polar Ecosystems are even less well defined and need further exploration.

Gilberto Câmara agreed with Stefano's summary, and suggested that the incoming CEOS Chair and SIT Chair recognise that they have to find out enough about the emerging initiatives to allow a decision to be made.

25-28	**CEOS Chair and SIT Chair, in coordination with CEOS SEC, will steward the further definition of the emerging initiatives (GEO-GLAM, Polar Ecosystems, Water, Biodiversity, expanded Disasters activities) for their further consideration at SIT-27**	**SIT-27**

Barbara Ryan noted that a WMO Polar Space Task Group exists to deal with the Polar Ecosystems effort. Stephen Briggs noted that ESA is providing a co-Chair for that Group and it should be taken into account in taking forward the action on emerging initiatives.

25-29	**CEOS agencies interested in participating in further side discussions on disaster-related matters, as raised by ESA at Plenary, to contact CEOS Chair**	**9 December 2011**

26 Integrating CEOS activities of Data Democracy and WGEdu

Presentation and discussion on proposed way forward

Stefano Bruzzi presented the background on reformulation of the Working Group on Education, Training, and Capacity Building (WGEdu), the results of study team discussions, and provided a proposed way forward to CEOS Plenary. He noted that an action from the Rio Plenary, as well as two actions from SIT-26 have called for the formation of a small team to study the matter, which has included participants from the CEOS Chair, GEO Secretariat, ASI, GISTDA, NASA, USGS, CEO, DCEO, ESA, INPE, and NOAA.

This study team looked at the name for the group, developing a draft Terms of Reference (ToR), and discussing future activities. The draft ToR have been circulated to CEOS Members, and call for the effective use of Earth Observation data, which is essential for the understanding and stewardship of our planet, and the advancement and sustainability of satellite Earth observations by empowering users through free access to these resources.

Stefano proposed that CEOS Plenary approve the establishment of the Working Group on Capacity Building and Data Democracy (WGCBDD), to be chaired by Hilcéa Ferreira (INPE), with Jacob Sutherlun (NOAA) as vice-chair. This was agreed by the meeting and the terms of reference adopted. Stefano congratulated the Chair and Vice-Chair and **asked that they take an informal action to consider a more elegant and abbreviated name for the Working Group.**

Report on recent outreach efforts and report from WGCBDD side meeting

Jacob reported on recent outreach efforts, including to WMO, GEOSS in the Americas, and the UN/IAF Workshop in Cape Town.

Hilcéa provided an update on the discussion from the WGCBDD side meeting on Monday, noting that the first meeting of the new Group will be 29th February – 1st March 2012 in Ilhabela, Sao Paolo, Brazil.

27 CEOS Calendar for 2011-12

Kerry Sawyer presented a summary of the CEOS calendar for 2011-12, noting that the CEOS calendar is available online at http://www.ceos.org. She noted that ensuring CEOS representation at key meetings requires notification by CEOS agencies of attendance at meetings. She noted several key events for 2011-12:

- COP-17, 4th-9th December, Durbin, South Africa;
- 5th GEOSS Asia-Pacific Symposium, January/February TBD, India;
- WGCV-34, 6th-9th February, Brisbane, Australia;
- CEOS-GEO Actions Workshop, 14th-15th February, Washington, D.C.;
- WGCBDD, 29th February-1st March, Ilhabela, Sao Paolo, Brazil;
- SIT-27, 26th-28th March, San Diego;
- CTF Meeting, 29th-30th March, San Diego (co-located with SIT-27);
- WGClimate will meet 17th – 19th April, Asheville, North Carolina;
- Rio+20, 20th-22nd June, Rio, Brazil; and
- 26th CEOS Plenary, week of 22nd October, Bangalore, India.

28 Publications and Outreach

Satomi Abe (JAXA) and Brian Killough presented a summary of plans for CEOS publications and outreach.

- In 2011 the 36th (February) and 37th (August) CEOS Newsletters were published by JAXA/MEXT;
- The 38th Newsletter is planned for February 2012, and the deadline for article submission will be 13th December 2011;
- Other publications planned for 2012 include: the annual CEOS one-pager (for GEO-8, Rio+20, GEO-9); Lucca Statement (for GEO-8, India for GEO-9); and the EO Handbook 2012; and
- Meeting booth support provided for GEO-VIII and GEO-IX; Rio+20; COP-17 and COP-18; and a COVE booth at IGARSS.

Satomi thanked all those who have contributed to CEOS publications, and also thanked the SEO for their strong support.

29 CEOS Planning for Rio+20

Rajeev Jaiswal (ISRO) presented a summary of CEOS plans for the Rio+20 Summit, noting several potential themes.

- Poverty Eradication and Sustainable Livelihoods;
- Protecting and Managing the Natural Resource Base;
- Sustainable Development Initiatives for Africa;
- Sustainable Development of Small Island Developing States; and
- Means of Implementation.

He noted that the first edition of the CEOS EO Handbook was produced for the original Rio meeting. For Rio+10, an updated Handbook, as well as a CEOS brochure on the contributions of space to sustainable development were produced. Plans for Rio+20 include:

- A Rio+20-oriented update to the CEOS EO Handbook (special edition);
- CEOS Exhibition Booth with handouts and videos;
- Organise a Side event on “Earth Observation from Space: Contributions to Sustainable Development", co-hosted by GEO, CEOS, UNOOSA and the Brazilian government; and
- CEOS will work with the Brazilian government and the Rio+20 steering committee to include recommendations on the use of space technology in the declarations about sustainable development that will be negotiated at Rio+20.

He noted that participation of multiple CEOS Agencies would be needed to ensure a successful showing at such a high profile event.

25-30	**ESA to confer with CEOS SEC on the definition of the approach and contents for the EO Handbook 2012**	**December 2011**
25-31	**CEOS Chair, in collaboration with CEOS SEC and INPE, to manage CEOS engagement and inputs for Rio+20**	**June 2012**

Gilberto Câmara encouraged that any discussions with CEOS member governments on promotion of space technology in support of Rio+20 objectives be communicated to INPE so that they can be as informed as possible in helping the Brazilian hosts to steward the meeting outcomes.

30 Incoming SIT Chair Statement

Mike Freilich reported that SIT-27 would be held 27th and 28th March at La Jolla – Scripps. Side meetings will be held on 26th March. The LSI and Carbon Task Force (CTF) will meet on 29th March, with the CTF meeting on the 30th March as well. Attendees are encouraged to register early since it may be a busy season in La Jolla.

Stephen Briggs queried whether additional time would be allowed for the Self Study reporting. Mike said that the meeting agenda would be designed appropriately. Brian Killough noted that an announcement and registration details would be circulated very soon.

31 Finalising the CEOS Lucca Statement

Stefano Bruzzi recalled the circulation of the draft statement during Day 1 of Plenary, and explained that he had attempted to capture as many comments as possible – with some compromises. *The final version of the Lucca Statement, generated based on post-Plenary coordination and finalisation, can be found in Appendix 2.*

Makoto Kajii encouraged that CEOS avoid reference to the GEO Data Sharing principles. Herve JeanJean (EC) concurred with Kajii's proposal. Alexander Uspensky (Roshydromet) noted the omission of the reference to Polar Ecosystems – and Stefano confirmed that this was a consequence of the decision earlier to defer discussion of some emerging initiatives. The statement just focuses on some key messages relating to CEOS activities, and is not inclusive. Ruth Boumphrey suggested rationalising reference to CEOS (there are multiple different uses of CEOS, CEOS agencies, CEOS member agencies).

25-32	**ASI CEOS Chair team to conclude and issue the final version of the Lucca Statement**	**COMPLETE**

32 CEOS Priorities and Outcomes for 2012

Kiran Kumar Seelin (ISRO) presented a summary of CEOS Chair principles and priorities for 2012. He emphasised the strong links between the Indian EO programme and national development goals. He also noted that ISRO contributes to a number of the CEOS Virtual Constellations through several of its current missions.

He noted a number of key areas for CEOS coordination, including:

- User linkages like GEO, CGMS, IPCC, UNFCCC, GCOS;
- Optimisation initiatives like the Constellations, the MIM database, and areas like climate coordination, JECAM and FCT/GFOI;
- Data standards and technical expertise like QA4EO, and numerous contributions to GEO Tasks; and
- Political linkages like the G-8, G-20, UN bodies and others.

He noted several priorities for CEOS for 2012, including:

- Consider, and begin to act on the outcomes of the CEOS Self Study;
- Sustain support for capacity building and data democracy (WGCBDD);
- Coordinate efforts for disaster early warning and climate monitoring; and
- Pursue with renewed vigour the completion of current and ongoing activities.

Kiran noted that CEOS Plenary would take place in Bangalore, India with the proposed dates pending final confirmation for CEOS members.

- Wednesday, 24th October 2012: Side Meetings;
- Thursday, 25th Oct 2012: Plenary Day 1;
- Friday, 26th October 2012: Plenary Day 2; and
- Saturday, 27th October 2012: Cultural Tour.

33 Future CEOS Chairmanships 2012-2014

The confirmed future CEOS leadership was reviewed as follows.

- 2012: ISRO is CEOS Chair and NASA is SIT Chair;
- 2013: CSA is CEOS Chair and NASA is SIT Chair;
- 2014: EUMETSAT has offered to take up the Chair.

Alain Ratier confirmed that EUMETSAT is willing to take up the Chair role for 2014. This was endorsed by Plenary and Enrico Saggese thanked EUMETSAT for the offer.

The contribution of several outgoing members of the CEOS community was recognised:

- Gilberto Câmara thanked the community for their friendship and hard work, and spoke about the privilege of working with CEOS; and
- Makoto Kajii thanked the community, noted that he had learned a lot being SIT Chair, and looks forward to continuing as JAXA's CEOS Principal.

Enrico Saggese handed over the CEOS gavel to Kiran Kumar Seelin of ISRO, and wished ISRO well for their year of CEOS Chairmanship.

34 Adjourn

Due to time constraints, CEOS Agency reports were not delivered, but the relevant materials are available on the CEOS Plenary agenda website.

Enrico Saggese adjourned the meeting and thanked all participants for their contribution.

Mike Freilich thanked ASI for their hospitality and the ASI CEOS Chair team for their considerable hard work and leadership over the last year.

List of Participants

Agency	Name	Agency	Name
ASI	Enrico Saggese	JAXA/SIT Chair	Makoto Kajii
ASI	Stefano Bruzzi	JAXA	Takao Akutsu
ASI	Vittorio De Cosmo	JAXA	Takashi Moriyama
ASI	Simona Di Ciaccio	JAXA	Osamu Ochiai
ASI	Stefania Arena	JAXA	Satomi Abe
ASI	Giuseppe Bianco	NASA	Mike Freilich
ASI	Augusto Cramarossa	NASA	Richard Eckman
ASI	Donatella Marucci	NASA	Brian Killough
ASI	Fabrizio Zucchini	NASA	Chris Blackerby
ASI	Laura Candela	NASA	Christine Bognar
ASI	Simona Zoffoli	NASA	Yonsook Enloe
ASI	Stephen Ward	NASA	Patricia Jacobberger-Jellison
CAS	Chuanrong Li	NASA (GGOS)	John Labrecque
CAS	Hongbing Niu	NASA	Francis Lindsay
CAS	Lingli Tang	NASA	Andrew Mitchell
Chinese Embassy	Yiyan Zhang	NASA	Shelley Stover
CNES	Pascale Ultré-Guérard	NASA	Gilbert Kirkham
CONAE	Ana Gabriela Medico	NASA	Diane Wickland
CONAE	Lucia Kocar	NASA	Kim Keith
CRESDA	Zhigang Wang	NOAA	Mary Kicza
CRESDA	Wen Zu	NOAA	D. Brent Smith
CSA	Luc Brûlé	NOAA	Mitch Goldberg
CSA	Guy Seguin	NOAA	John Bates
CSA	Marie-José Bourassa	NOAA	Kenneth Casey
CSIRO	Alex Held	NOAA/DCEO	Kerry Sawyer
DLR	Klaus Schmidt	NRSCC	Guocheng Zhang
DLR	Martin Wegmann	NRSCC	Xiaohan Liao
EC	Hervé JeanJean	NSC	Per-Erik Skrøvseth
EC-JRC	Mark Dowell	NSC	Ake Rosenqvist
ESA	Stephen Briggs	NSMC/CMA	Jinlong Fan
ESA	Simonetta Cheli	NSMC/CMA	Jinsong Wang
ESA	Ivan Petiteville	SANSA	Sandile Bethuel Malinga
ESA	Peter Regner	SRC Planeta/ Roshydromet	Alexander Uspenskiy
ESA	Frank Martin Seifert	UKSA	Ruth Boumphrey
ESA	Stephen Plummer	University of Jena	Christiana Schmullius
EUMETSAT	Alain Ratier	USGS	Jean Parcher
EUMETSAT	Paul Counet	USGS	Bruce Quirk
GCOS	Carolin Richter	USGS/CEO	Timothy Stryker
GEOSEC	José Achache	US Dept. of State	David Turner
GEOSEC	Giovanni Rum	WGCV/USGS	Greg Stensaas

GEOSEC	Georgios Sarantakos	WGCBDD/INPE	Hilcéa Ferreira
GISTDA	Pakorn Apaphant	WGCBDD/NOAA	Jacob Sutherlun
INPE	Gilberto Câmara	WGISS/GISTDA	Pakorn Apaphant
ISRO	Kiran Kumar Seelin	WGISS/JAXA	Satoko Miura
ISRO	Rajeev Kumar Jaiswal	WMO	Barbara Ryan
ISRO	Diwakar Parsi G		
ISRO	Kumar Sateesh		

CEOS Lucca Statement

9 November 2011

We, the assembled participants of the 25th Plenary meeting of the Committee on Earth Observation Satellites (CEOS), in Lucca, Italy, on 8-9 November 2011:

Building upon the engagements taken collectively in Rio de Janeiro and on the long term continuity of engagements of the CEOS agencies, from RIO '92 to Rio+20, the establishment of Group for Earth Observation (GEO) and the wealth of significant results these developments have generated;

Recognizing the major involvement and the commitment of CEOS agencies in the implementation of the space-based component of the Global Earth Observation System of Systems (GEOSS), their individual contributions to the activities of the GEO, the need for improved coordination of all Earth observation contributions to the study of the Earth system, and also **recognizing** the role that CEOS can and must play in that coordination effort;

Recognizing that, among several active and potential CEOS stakeholders, the Group on Earth Observations (GEO) must continue to play a key role, by providing direction about the sharing of information, reaching a common understanding of user requirements, and improving delivery of information to users;

Confirming that, in response to the requirements of the stakeholders, CEOS agencies are ready to coordinate worldwide satellite Earth observation related activities to ensure comprehensive and sustained information, addressing critical gaps and supporting the interoperability of the different observation assets;

Recalling that CEOS has continued to support in 2011 UNFCCC (United Nations Framework Convention for Climate Change), GCOS (Global Climate Observing System), and other requirements (in the GEO framework) for the provision of information in support of climate studies, and continues to support other "Rio" conventions, UNCCD (United Nations Convention to Combat Desertification), UNCBD (United Nations Convention for Biodiversity).

Recalling that CEOS has made decisive steps to meet its commitments made in the 2010 Rio Statement in relation to:

(i) Developing a data quality assurance strategy for GEO and the first steps towards its implementation, to enable the exchange, interoperability and merging of Earth observation data from multiple space data sources;

(ii) Supporting the development of the GEOSS common infrastructure, by contributing essential building blocks to its implementation, by making available an increased number of data sets and by improving the capability and flexibility to access data from different providers and agencies;

Declare that:

CEOS Agencies have decided at the recent plenary in Lucca to focus on the following priority initiatives which will constitute the core of their programme for the years ahead:

- An integrated high priority initiative in support of Climate Change studies, comprising:
    - Continued support to the Global Forest Observation Initiative (GFOI) and leadership in the coordination of the necessary satellite observations, including through the establishment of a Space Data Coordination Group for that purpose;
    - The production of a CEOS Strategy for Carbon Observations from Space.
    - The improvement, in quality and quantity of the coordinated production of Essential Climate Variables (ECVs). This will in turn improve the CEOS ability to respond to the GCOS Implementation Plan and to report to UNFCCC.
    - The contribution to the definition and implementation of a Climate Monitoring Architecture from Space, in the GEO framework, in cooperation with the World Meteorological Organization (WMO) and the Coordination Group for Meteorological Satellites (CGMS).
- The definition and implementation of new activities in support of sustainable development and environmental management
    - The Joint Experiment for Crop Agricultural Monitoring (JECAM) and a potential response to G20 requirements for Global Agricultural Monitoring, as part of hunger relief and food security initiatives
    - An initiative for global monitoring of the water cycle
- The development of a more integrated approach in the areas of disaster mitigation and disaster management
    - Continued progress in the implementation of the Geo-hazards Supersites initiative to further the understanding of tectonic processes in relation to natural disasters
    - An emphasis of the role that CEOS agencies can play in the complete Disaster Risk Management Cycle, in response to requirements from operational stakeholders.

CEOS agencies confirm their dedication to broadening data access and exploitation capabilities by users in developing countries and elsewhere through a reconstituted CEOS working Group on Capacity Building and Data Democracy. CEOS will define and promote additional initiatives in the domains of data dissemination, sharing of software tools, increased training and education, and technology transfer to end users. CEOS agencies support the application of the GEOSS Data Sharing Principles and will contribute both to the GEO Common Infrastructure and to other ways to make

access and use of Earth Observation data easy, understandable and responsive to the needs expressed by the user organizations.

CEOS plays a vital role in ensuring coordination of Earth observations to enable decisions for securing a prosperous and sustainable future for mankind.