

CEOS NEWSLETTER

Committee on Earth Observation Satellites
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From 2013-2014 CEOS Chairman

Alan Ratier and Paul Counet, EUMETSAT

The 28th CEOS Plenary, chaired by EUMETSAT and co-hosted by Met Norway and the Norwegian Space Centre, took place in Tromsø, Norway and was attended by 80 participants from 29 organisations. Some of the main outcomes of this plenary are now briefly described.

As 2015 was identified as being an exceptional year for CEOS with three important events [COP-21, World Conference on Disaster Risk Reduction (WCDRR) and the GEO Ministerial] a Tromsø Statement was developed by the Plenary, building upon the Montreal Statement, to convey key CEOS messages to these events (the Tromsø statement is available on the CEOS website: <http://ceos.org/wp-content/uploads/2014/11/Tromso-Statement-Nov-2014.pdf>).

Plenary were informed about the current status of the draft GEO Strategic Plan that will be presented at GEO-XI Plenary for discussion and guidance. The current version of the Plan appears to be consistent with a greater role for Participating Organisations such as CEOS in the governance of GEO. Written and verbal CEOS interventions will be prepared for the GEO-XI Plenary emphasising the unique coordination role of CEOS, CEOS's successful contributions to GEO and the need for a formalised level of CEOS participation in GEO governance.

GCOS noted that preparations are underway for the next GCOS Status Report for submission to SBSTA-43 at the end of 2015. In parallel, GCOS will start drafting a new Implementation Plan which inter alia requires that GCOS considers new developments, systems and frameworks, such as the Global Framework for Climate Services and the Global Earth Observation System of Systems. This plan will be published at the end of 2016, and is expected to influence the agenda for climate observations at both the global and regional scales.

Europe was congratulated on entering a new era in space with the Copernicus Programme, noting that by 2020 there will be eight Sentinel satellites in orbit providing data for Copernicus Services.

In response to a request from the recently formed CEOS Working Group on Disasters, proposals for two new supersites were endorsed ("New Zealand Volcanoes" and "Ecuadorian Volcanoes") and it was agreed to follow a written procedure for endorsing the proposed "South-East Asia Natural Laboratory for Geohazards".

Following discussions on the future shape of the Land

Surface Imaging Virtual Constellation (LSI-VC), Plenary decided to endorse the "Space Segment Coordination" option for a LSI-VC, and to task the LSI-VC team with preparing a draft Implementation Plan.

The Plenary thanked Satish Srivastava for his contributions both as Vice-Chair and Chair of WGCV, endorsed Dr Kurtis Thome of NASA as Vice-Chair of WGCV and welcomed the incoming Chair of WGCV, Albrecht von Bergen of DLR.

Nominations were sought for the impending vacancy of the Co-Chair of the Space Data Coordination Group for the Global Forests Observations Initiative.

Phase 2 of the CEOS acquisition strategy for GEOGLAM was endorsed, and NASA (Dr. Brad Doorn) and CNES (Selma Cherchali) were confirmed as co-leads for CEOS Ad Hoc Working Group on GEOGLAM.

The proposed approach for the implementation of the CEOS Carbon Strategy was endorsed, involving the SIT Chair in an overall coordination role and for the implementation of some actions, and VCs and WGs for the implementation of specific actions related to their respective mandates.

The GEOSS Water Strategy was confirmed as a relevant guidance document for CEOS activities and it was decided to establish an Initial Study Team to define the potential CEOS contribution to the implementation of the Strategy.

The proposal by JAXA to develop a *CEOS Data Applications Report*, with contributions from CEOS Agencies, was supported.

It was noted that a special Edition of the EO Handbook will be produced for the WCDRR in Sendai, Japan on 14-15 March 2015.

The main outcomes of the 2014 Climate Symposium were discussed and are separately described in a dedicated article within this newsletter (cross-reference to be inserted by JAXA).

CNES informed Plenary that, in the lead up to COP-21, a Scientific Conference "Our Common Future under Climate Change" will take place on 7-10 July

2015 at UNESCO in Paris, and a number of sessions will be dedicated to contributions from space and CEOS Agencies. The CEOS-CGMS Working Group on Climate will be invited to participate.

Following the recent CEOS Self-Study Initiative, led by NASA, the Plenary welcomed the arrival of a rolling 3-Year Work Plan that provides a reference point against which CEOS can systematically monitor progress with respect to an agreed schedule of deliverables and objectives.

The proposal for ESA to assume the vacant role of SIT Vice-Chair, and to become SIT Chair after the 29th CEOS Plenary in Kyoto in November 2015, was welcomed and endorsed.

It was confirmed that as from 1st December 2014 Mrs Marie-Josée Bourassa (CSA) will take over the role of CEO from Kerry Sawyer, and Jonathon Ross (GA) will become DCEO. At the 2015 CEOS Plenary the roles will be reversed, with Jonathon Ross becoming CEO and Marie-Josée Bourassa becoming DCEO. A special vote of thanks was given to Kerry Sawyer, the outgoing CEO, for her outstanding support and commitment to CEOS over many years.

Shizuo Yamamoto, the incoming JAXA CEOS Chair, highlighted the three priority areas for JAXA as: (i) providing evidence of the value and benefit of EO data to governments and international organisations; (ii) Placing EO data in the mainstream of Disaster Risk reduction (DRR); and (iii) Promoting space-ocean alliances and ocean information services.

Finally, JAXA introduced their CEOS Chair Team and announced that the next CEOS Plenary would be held in Kyoto, Japan on 5-6 Nov 2015.



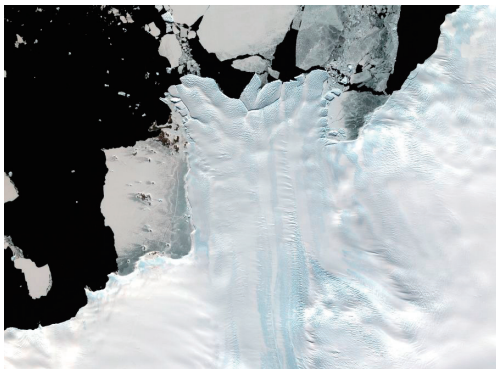
CEOS Plenary group photo

SIT Technical Workshop Report

Pascale Ultré-Guérard and Steven Hosford, CNES

The Strategic Implementation Team's technical workshop was held this year on the 17th and 18th September in the city of Montpellier on France's Mediterranean coast. This meeting, generally used principally to prepare for CEOS plenary, gave the opportunity this year to also take some time out to discuss in more detail the operation of CEOS's Virtual Constellations and Working Groups and the interactions between these entities. A full day meeting dedicated to this theme was held on Tuesday, 16th September, 2014.

All VCs (i.e., SST, OST, OSW, ACC and P-VC) except the LSI were present or represented. All WGs (i.e., WGCV, WGISS, WGCapD, WGClimate, WGDIsasters) were present. This special event was an opportunity for VC and WG leads to discuss common issues and also to highlight the remarkable achievements of the VCs and WGs and the potential improvements that can result from enhanced



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interaction between various CEOS groups.

Four topics were successively discussed during the VC/WG Day:

- VC-WG interactions in terms of support needed and/or offered and CEOS promotion and recognition of VC/WG achievements: for CEOS to achieve greater success, and building on the success of this first workshop, an immediate recommendation to CEOS and SIT was to hold annually a VC/WG Day organized and led by the VC/WG leaders;
- Training Activities: an immediate recommendation was that each VC should have a point-of-contact with WGCapD (and other WGs as well);
- ECV Products, Reporting to SBSTA: a mechanism was proposed to improve two-way communications between WGClimate and VCs;
- Data management and data access: various mechanisms were suggested to resolve data coordination issues; CEOS-GEO framework agreements with donors could be a promising avenue, provided that a strong case can be presented.

All in all, the VC/WG Day was perceived as a very successful initiative, resulting from past years' interaction between the SIT Chair Teams and VC/WG Leads. There was a broad consensus that such an opportunity to exchange views was an important addition to the CEOS calendar and should be scheduled again in 2015. A number of tentative suggestions for discussion topics were put forward for such a day in 2015.

In addition to this important subject, the Technical Workshop itself continued to move forward a number of subjects including preparation of the World Conference on Disaster Risk Reduction, analysis of options for continuity of the Land Surface Imaging Virtual Constellation, organizing CEOS's response to the GEOSS Water Strategy and discussion of the plan for implementation of the CEOS Carbon Strategy recommendations. These themes were in addition to the continuing activities of the Working Groups and Virtual Constellations and the ad-hoc teams – the Space Data Coordination Group for GFOI and the ad-hoc team on GEOGLAM. Last but not least, the proposals for continuity in the positions of CEOS Executive Officer and Deputy CEOS Executive Officer were reviewed. We are happy to welcome our colleagues Marie-José Bourassa and Jono Ross

(to be continued on page 3)



SIT Technical Workshop held in Montpellier from 16th to 18th September 2014

CEOS plans for COP21/UNFCCC

Satellites play a crucial role in the observation of climate change and its impact on environment as it is stated in the 5th IPCC report. Every two years CEOS reports on its activity on climate to SBSTA (Subsidiary Body for Scientific and Technical Advice) of UNFCCC (United Nations Framework Convention on Climate Change). There will be an additional report in 2015 due to COP 21. Indeed at the end of 2014, in its conclusions, the SBSTA "noted the importance of continuing and sustaining satellite observations on a long-term basis and welcomed the efforts to develop an architecture for climate monitoring from space. It invited CEOS to report on progress made at SBSTA 43, and at subsequent sessions, as appropriate." The SBSTA 43 is planned just before the COP 21 to be held in Paris from 30th November to 11th December 2015 and during which an international agreement is expected about how to limit global warming to 2 °C.

2015 will definitely be the year of "climate challenges".

A scientific Conference "Our Common Future under Climate Change" will be organized before the COP 21. It will be held in July (7th-10th) at UNESCO, Paris, France. The conference is organized over four days alternating plenary and parallel sessions : day 1 is dedicated to the State of knowledge on Climate Change, day 2 is dedicated to the Scenarios exploring our common future, day 3 is about responding to Climate Change Challenges and the fourth day is dedicated to collective actions and transformative solutions. Several sessions involving space observations and related activities have been submitted, in particular for day 1 and day 3. The CEOS SIT Chair, CNES, is a partner of the conference and is member of the high level committee. CEOS members (agencies, WG Climate) have been invited to contribute to these sessions (oral or poster). More information are available on the Conference website <http://www.commonfuture-paris2015.org/>. It is also possible to subscribe to a mailing list to receive the information about the conference and related side events. At this conference, it is also planned to discuss the findings and recommendations of the

Steven Hosford, CNES

Climate Symposium 2014, organized by WCRP and EUMETSAT as part of EUMETSAT CEOS Chair tenure last October. The findings and recommendations from the Climate Symposium have been released by the Scientific Committee and are available on the Climate Symposium website (<http://www.theclimatesymposium2014.com/>).

CNES's exhibition at the Paris Air Show at Le Bourget in June will be mainly dedicated to climate change issues and, as part of this, we plan to organize a round table with diverse CEOS space agency participation (TBC). The Air Show exhibition will be re-used during the COP 21 at a prominent public location in the center of Paris. There will be a lot of side events related to climate during the year 2015 as well as at the occasion of the COP itself and a lot of opportunities to communicate on the essential role satellites and space agencies play in climate studies, particularly through CEOS and the recently established joint CEOS-CGMS (Coordination Group for Meteorological Satellites) working group on climate.

Outcome of 2014 Climate Symposium

Alan Ratier and Paul Counet, EUMETSAT

The Climate Symposium 2014, organised by EUMETSAT and the WCRP (World Climate Research Programme) and supported by the EC (European Commission), ESA (European Space Agency) and other agencies, took place in Darmstadt from 13th to 17th October 2014. Around 500 participants attended the event from 49 countries and representing over 200 organisations. Another 500 individuals participated remotely via "live-streaming".

The Symposium was entitled "Climate Research and Earth Observation from Space – Climate Information for Decision Making" and was organised around the six "Grand Science Challenges" of the WCRP, namely:

- Clouds, Circulation and Climate Sensitivity;
- The Changing Water Cycle;
- Cryosphere in a Warming World;
- Ocean Circulation and Regional Sea Level Rise;
- Prediction and Attribution of Extremes: from Climate to Weather;
- Regional Climate Variability and Change: Enabling Climate Services.

During the Opening Session of the Symposium, these Grand Science Challenges were placed in the context of the recently completed, and future, IPCC Assessments by Thomas Stocker, co-chair of IPCC Working Group One. Following this scene-setting

session, the subsequent sessions were devoted to the Grand Science Challenges, addressing the specific need for, and role of, climate observations from space. A round-table discussion focused on the role of science-based climate information for decision makers. This session benefited greatly from the perspectives of high-level representatives from the energy, transport, commercial real estate, and insurance sectors who described how they use climate information for their decision making, and the need for some high-priority information in the future. The Early Career Scientists participated actively in the Symposium and reported daily on oral and poster sessions. Several of the Early Career Scientists were awarded special prizes for the quality and innovative aspects of their scientific presentations.

The Symposium concluded with a presentation of the main findings and recommendations emerging from the Grand Challenges sessions, and a final round-table session with space agencies and sponsors of Earth observations and research. This session was moderated by the Global Climate Observing System (GCOS) and the participants shared plans and priorities of their respective organizations for Earth observations during the coming decade. The participants also discussed the Architecture for Climate Monitoring from

Space, coordinated by the CEOS-CGMS Working Group on Climate, and how it can be used to meet the observational needs emerging from the Symposium.

Based on the presentations and discussions at the Symposium, the Science Programme Committee identified a number of findings and recommendations which are available, together with the full programme and presentations at: <http://www.theclimatesymposium2014.com>

Following the discussions at the 28th CEOS Plenary, it was decided that the main outcomes of the 2014 Climate Symposium in Darmstadt will be made available to the Scientific Conference preceding COP-21: "Our Common Future under Climate Change" planned for July 2015.



Working Group on Climate (WGClimate)

John Bates, NOAA, WGClimate Chair

One of the important reporting activities of the CEOS – CGMS joint working group on climate, is to the United Nations framework convention on climate change. Our input is provided to the subsidiary body on scientific and technological advice and they have asked us to report on a coordinated response from space agencies to the framework convention needs for global observations. The primary input has been, and continues to be the space agencies response to the requirements for climate products of the global climate observing system.

This year, we provided a response that emphasized

recent activities of the joint working group on climate. The first part of the report summarized the architecture for climate monitoring from space, the vision for the joint CEOS – CGMS working group on climate, and the work plan for the group for the next several years. The second part of the report summarized the strategy for carbon observations from space report. As you recall, this report identifies what can be achieved through CEOs actions to better coordinate existing and future capabilities of earth observation satellites, as well as those challenges that require additional resources and/or mandates beyond the present capacity of CEOs and its member agencies.

We were very pleased at the response of SBSTA to our report. They responded that, "The SBSTA expressed its appreciation to CEOS and CGMS for their updated report on the progress made by space agencies providing global observations in their coordinated response to relevant needs of the Convention. It noted the importance of continuing and sustaining satellite observations on a long-term basis and welcomed the efforts to develop an architecture for climate monitoring from space. It invited CEOS to report on progress at SBSTA 43 (December 2015 in Paris, France), and at subsequent sessions, as appropriate."

(continued from page 2)

to these positions that have since been endorsed at Plenary. Kerry Sawyer, as outgoing CEO, is to be warmly congratulated for the steady ship she ran during her tenure and we wish her all the best in her attempt to reacclimatise to the real world!

The preparation for the 30th meeting of the Strategic Implementation Team is now well underway, with the meeting to be held at CNES headquarters in Paris from 30th March to 1st April. While the detailed agenda

has not yet been finalized, a focus on CEOS's external stakeholders is to be proposed in line with two major international conferences of particular relevance to the Earth Observation community to be held this year: the WCDRR in March; and COP-21, also to be held in Paris, in December. SIT will aim to review the outcomes of the WCDRR, which occurs a fortnight earlier, from an Earth Observation perspective and draw "lessons learned" from the preparation of this conference. This preparation has been an important focus for CEOS, and particularly the Working Group

on Disasters, over the last 18 months or so. These "lessons learned" should also inform the preparations for the COP-21. One of the objectives of SIT-30 will be to begin to establish items that CEOS should seek to promote in the COP-21 context to demonstrate the utility of Earth Observation data in climate monitoring. Over and above this external stakeholders focus, the broad range of CEOS business will also be moved forward during SIT-30. We will need your continued active participation to do this and so hope to welcome you to Paris in March.

GEO-XI Plenary Report

Under the theme, "Taking the Pulse of the Planet", 275 members of the GEO community, from more than 45 countries, discussed the next steps in creating and implementing a Global Earth Observation System of Systems (GEOSS) during the Group on Earth Observations (GEO) Eleventh Plenary Session held on 12-14 November 2014 in Geneva, Switzerland.

The Implementation Plan Working Group (IPWG) reported the draft *GEO Strategic Plan 2016-2025: Implementing GEOSS*, beginning by reviewing the charges from previous GEO Plenaries and the 2014 Geneva Ministerial regarding the development of the next phase of GEOSS implementation. The Plan covers five major issues: core functions, governance, engagement with developing countries, engagement with the private sector, and resources for GEO and GEOSS through 2025. The Plan contains three action areas with strategic objectives – Advocate, Engage, Deliver – and new management mechanisms that would be based on specific decisions of GEO. The GEO community provided the IPWG significant feedback in development of the strategic objectives.

The GEO Engagement Strategy was also discussed, focusing on defining GEO's different stakeholder communities, their expected contributions to GEO, what GEO has to offer them, how GEO should prioritize its engagement efforts across stakeholder communities, and what are

the different ways GEO could engage with these diverse communities. The Plenary discussed the importance of engaging with UN agencies and conventions; other international agendas, including the emerging Sustainable Development Goals; international development banks, and international development agencies. GEO must make every effort to engage with these organizations and mechanisms at the highest levels to understand the nature of potential partnerships, and engage in projects accordingly.

The Plenary also included an announcement of the top three winners of the GEO Appathon, a global "app" development competition built on the 80 million-plus resources currently available through GEOSS. The Appathon attracted 250 competitors from 50 countries and will generate easy-to-use decision tools for mobile devices and computers.

Key GEO initiatives were also highlighted during the meeting, including developing a comprehensive system to monitor the availability and quality of fresh water, in partnership with the World Health Organization, the UN Environmental Programme and other UN agencies as part of the UN Sustainable Development agenda. Also, GEO is leading the creation of an Africa-wide technological and human infrastructure – AfriGEOSS to provide

Osamu Ochiai,
GEO Secretariat



decision makers with the capacity to access and utilize Earth observations in making key decisions. To strengthen agricultural activity and reduce market volatility, the GEO Global Agricultural Monitoring initiative (GEOGLAM) is coordinating the assessment of growing conditions of the world's major crops through a combination of regional expertise, ground observations and analysis of meteorological and satellite data.

Finally, Espen Volden finished up his assignment to the GEO Secretariat and has re-joined ESA/ESRIN. We thank him for all of his excellent contributions to both GEO and CEOS.



Introducing the new CEOS Executive Officer Team

From 1 December, 2014, CEOS has a new CEOS Executive Officer (CEO) Team: Marie-Josée Bourassa from the Canadian Space Agency, as CEO, assisted by Jonathon Ross from Geoscience Australia, as Deputy CEO. We would like to take this opportunity to introduce ourselves to the CEOS community more broadly.

Marie-Josée has been working with CEOS since the Canadian Space Agency served as incoming Chair in 2011. As an advisor to the Director General of Space Utilization, she has been closely involved in the CSA's chairmanship, topped with the Montreal plenary in 2013. She is an engineer and professional project manager with both public and private sector experience. She is keen to help CEOS bring even greater value to its agencies.

Jonathon is the Director of Earth Observation Strategy, in the National Earth and Marine Observations Group at Geoscience Australia, located in the Australian capital of Canberra. His background is in computer science, and he has a particular interest in the important role that information systems will play in unlocking the astounding value of data observed from space. Jonathon has been involved with CEOS since Geoscience Australia joined as an Associate in 2013.

Marie-Josée and Jonathon will work as a team to deliver on the functions of CEO, with the aim of delivering the same high level of support and service that CEOS's leadership, CEOS entities and stakeholders have received from previous holders of these importance offices.



Jonathon Ross and Marie-Josée Bourassa

The incoming CEO Team would like to express their warmest appreciation to Kerry Sawyer for her guidance and support, and for leaving the incoming CEO Team an amazing legacy to build on.

We look forward to working closely with all of you to build on the amazing success of CEOS to date. The roles of CEO and DCEO play an important role in supporting CEOS to optimise the benefits derived from space-based observations, and we aim to fulfil the roles accordingly.

Working Group on Capacity Building and Data Democracy (WGCapD)

CEOS WGCapD continues to collaborate with the GEO Capacity Building Portal (GEOCAB) developers, whose main objectives are to provide information that helps decision makers, policy makers, EO professionals and scientists to become more familiar with EO applications and opportunities, and to make these information freely accessible through a web resource facility. The GEOCAB portal was unveiled at the GEO-XI Plenary in November 2014, and is now available in a first operational version available for feedback at www.geocab.org. The portal allows any user to query the capacity building resource inventory. CEOS WGCapD continues to collaborate by providing inputs to the inventory and feedback about the portal.

WGCapD's has advocated for release of digital elevation models for several years. Now the US Government is releasing its

global SRTM 30 meter dataset in four Phases: Africa - which was released in September 2014; the Western Hemisphere and most of Europe in November, 2014; East Asia and Oceania in January, 2015; with the Middle East to be released by August. Two versions of the 30 meter resolution data can be accessed at <http://earthexplorer.usgs.gov> and at <https://lpdaac.usgs.gov>. Associated with the releases, WGCapD is planning a series of regional workshops designed for government users of DEMs, particularly focused on flood applications. The first will be hosted by SANSA in Pretoria March 23-27, following our annual meeting. The second will be hosted by CRECTEALC in Puebla, Mexico at May 25-29.

WGCapD is finalizing its online capacity building strategy for 2015 and onwards. The initial implementation is the development of a series of webinars

Eric Wood,
USGS,
WGCapD Chair



Jane Olwoch,
SANSA,
WGCapD Co-Chair



focusing on the use of Remote Sensing Technology for Disasters Risk Management. The target audience will be disaster practitioners and is scheduled to begin in April.

Finally, we invite you to attend our 4th WGCapD meeting to be hosted by SANSA from March 18-20, 2015 in Pretoria, South Africa.

Working Group on Disasters (WGDisasters)

Participants in the second WGDisasters meeting (CNES HQ, September 10-12) have focused their attention on all aspects related to the provision of data the pilots and the 2015 World Conference on Disaster Risk reduction (WCDRR, March 14-18, 2015, Sendai, Japan).

The CEOS pilots on Floods, Seismic Hazards and Volcanoes are progressing well. Non-CEOS members of the Pilot teams have already processed satellite data delivered by various space agencies and their first results have been shown at the 28th CEOS Plenary. In addition to the scientific exploitation of the space data, end users are gradually being involved in the Pilots e.g. the Namibian Department of Water Affairs and Forestry in the Floods Pilot; Volcanic Ash Advisory Centers (Buenos Aires and Washington) and several volcano observatories in Latin America will progressively be involved in the Volcanoes Pilot in 2015.

The number of both permanent and event Geohazards Supersites is constantly increasing (respectively 7 and 3 in 2014) and satellite data regularly delivered to the scientific teams

Several key stakeholders (UNDP, World Bank, Red Cross, UNOSAT, UNISDR) have expressed their willingness to join the

Recovery Observatory (RO) project during a first meeting (Geneva, 7 Oct. 2014) aiming at developing institutional relationship and engaging them in the RO triggering process. The top management of both UNDP and World Bank GFDRR (Global Facility for Disaster Reduction and Recovery) have further confirmed their participation in December.

WGDisasters has been very active in the preparations of both the 3rd UN WCDRR and post-2015 framework for disaster risk reduction (HFA2). National Negotiators participating in the 2nd Preparatory Committee meeting (Geneva, 17-18 Nov.) have granted CEOS the role of Observer with the right to seat and speak at all future Preparatory Committee meetings and in Sendai recognising the key role played by space agencies in Disaster Risk Reduction (DRR) through the various actions conducted in the last three years. Several new statements favourable to EO from space and to CEOS as organisation have been introduced to the review of the draft HFA2 document. In parallel, CEOS closely works with 17 international partners to organise a two-hours working session in Sendai, largely focused on the benefits of space EO for DRR for the coming 15 years.

Ivan Petiteville, ESA, WGDisasters Chair

Eventually, CEOS contribution to WCDRR includes the publication of the brochure on the "Satellite Earth Observations in Support of Disaster Risk Reduction" (Special Edition for 2015 WCDRR) that includes in particular a foreword from Mrs Margareta Wahlström (Special Representative of the UN Secretary-General for Disaster Risk Reduction and Head of UNISDR) followed by a series of nine articles showing concrete examples of the added value of remote sensing to the work of the disaster risk management stakeholders.

CEOS need to work closely with key actors, governments and international organizations to ensure a stronger role for EO from space in the coming decade.



Participants in the 2nd Preparatory Committee meeting (17-18 November 2015, Geneva)

Working Group on Information Systems and Services (WGISS)

The 38th WGISS meeting was hosted by Roscosmos and by JSC "Russian Space Systems" (Moscow, Russia), in Moscow, Russia, from September 29 to October 3, 2014. There were 47 participants, (including 15 remotely), from 19 agencies or institutions.

During this meeting, the main activities were:

- CEOS OpenSearch Workshop, which mainly targeted for implementers (engineers) of CEOS agencies. The objective was to learn to access and make better use of CEOS catalogs using OpenSearch, and to align OpenSearch server implementations with CEOS Best Practice.
- Discussion on Recovery Observatory Infrastructure - a system to support the coordinated acquisition of Earth Observation data and its easy access for recovery after a disaster of an extreme magnitude.
- Data stewardship Interest group has delivered 3 documents for general review
 - Preservation Workflow
 - Generic EO Dataset Consolidation Process
 - Persistent Identifiers Best Practices
- Several presentations during Technology Exploration Interest Interest group : US Big Earth Data Initiative, Hadoop and Data Cube from GeoScience Australia
- CEOS Interoperability Interest Group:
 - IDN:ISRO and EUMETSAT have created new collection metadata entries that are now accessible using the IDN.
 - CWIC:ISRO and EUMETSAT will both

become operational in the next several months. Now the RADARSAT1 and RADARSAT2 data are accessible from CCMEQ. ROSCOSMOS started development to connect their data to CWIC. CWIC continues to be a major source for satellite data for GEO.

- FedEO gateway infrastructure has been consolidated and provides access to more than 500 EO data collections to external clients including the GEO Web portal.

In October, WGISS held a CEOS Plenary side meeting dedicated to "Emerging technologies". The objective of this side meeting was

- to present the WGISS Technology Exploration Interest group
- to present Big data and cloud computing technologies
- to explain the positive ways the WGISS Technology Exploration Interest Group can serve CEOS

In October, the first version of the "Recovery Observatory Infrastructure" has been delivered to CEOS. This will be used if the Recovery Observatory is triggered before July 2015.

A second version will be delivered in mid-February 2015. This version will be operationally

Richard Moreno,

CNES, WGISS Chair



used for the CNES KalHaiti project dedicated to the recovery of Haiti Earthquake.

A third and final version will be delivered end of June 2015.

WGISS will work in 2015 with CEOS SEO on the subject of Data Cube which is an initiative of GeoScience Australia.

The 39th WGISS meeting will be hosted by JAXA, in Tsukuba, Japan from May 11th to 15th 2015.



Working Group on Calibration and Validation (WGCV)

The 38th Working Group on Calibration and Validation (WGCV) plenary meeting was co-hosted by NASA, NOAA, and USGS at NOAA's Center for Weather and Climate Prediction in College Park, Maryland, USA from September 30th to October 2nd, 2014. Around



The WGCV troika (from left to right): Dr. S. K. Srivastava (CSA, past chair), Dr. A. von Bargaen (DLR; incoming chair), and Dr. Kurtis Thome (NASA; vice-chair)

35 participants representing 18 agencies and institutions attended the last WGCV plenary chaired by Dr. Satish K. Srivastava (CSA). The whole WGCV likes to express its high appreciation of his chairmanship and his initiatives to promote all WGCVs activities including encouraging agencies in participation. Dr. Kurtis Thome (NASA) was also approved as incoming vice-chair by the CEOS plenary and completes with the incoming chair, Dr. Albrecht von Bargaen (DLR), until 2016 the current troika.

Among the Agencies and WGCV sub-groups reports three foci were the driver for the WGCV plenary session: (i) The intensification of collaboration with the Virtual Constellations; (ii) cross-cutting themes over different sub-groups and (iii) the collaboration with WMO/GSICS. The first focus is a continuous effort which had been also presented during the SIT workshop: The set-

Albrecht von Bargaen,

DLR, WGCV Chair



up of the fiducial reference measurements sites including radiometric laboratory comparisons for Sea Surface Temperature and later for Land Surface Temperature became implemented with an ITT by ESA which is currently under evaluation. In addition, the implementation of a calibration network for radiometric measurements (RADCALNET) has been discussed in terms of future addition of further sites. Another cross-cutting theme was the usage of DEMs and the topic of cloud masking in different EO applications. For that a special planning meeting which will be held in February 2015 in Radebeul (Germany), has been agreed to foster concrete mini projects. The Land Product Validation sub-group defined in a clear 4-step approach a metric for land product evaluation. A detailed description can be found on the re-worked website of LPV.

GEO Global Agriculture Monitoring (GEOGLAM)

Agricultural markets have become increasingly volatile, threatening food security and human livelihoods. Access to timely, accurate, and transparent information about crop condition and production helps stabilize markets. For this reason the Group on Earth Observations (GEO) Global Agricultural Monitoring Initiative aims to strengthen the international community's capacity to produce and disseminate relevant, timely, and accurate forecasts of agricultural production at national to global scales through the use of space-based Earth observations.

Despite the legacy of remote sensing having roots in agricultural monitoring, many countries have not yet adopted space-based monitoring due to unreliable or inaccessible data. To respond to these challenges, CEOS formed a working group for GEOGLAM to coordinate the acquisition of appropriate data for agricultural monitoring and to facilitate access by agricultural experts across the globe. To date, CEOS has focused its efforts on providing data for the Agricultural Market Information System (AMIS) and the GEOGLAM research and development component,

JECAM (Joint Experiment for Crop Assessment and Monitoring). Through targeted acquisitions over diverse agricultural landscapes, JECAM is developing best-practices for monitoring that will inform next generation broad scale data acquisitions.

The CEOS Ad Hoc Working Group on GEOGLAM recently approved two co-leads at the CEOS Plenary meeting in November 2014: Dr. Bradley Doorn (NASA) and Dr. Selma Cherchali (CNES). Through their relevant experience and that of the pending GEOGLAM Steering Committee (managed by GEO), the GEOGLAM effort will advance and mature in the coming year. Most recently, CEOS endorsed the GEOGLAM Data Acquisition Strategy, which defines the process to supply satellite data to GEOGLAM Croplands Projects (9 countries), JECAM (19 sites), and Asia-Rice (10 countries). In 2015, the group will expand its efforts (more countries, products, sampling) and conduct an archive assessment to improve baseline datasets.

In cooperation with the CEOS Ad Hoc Working Group on GEOGLAM, the CEOS Systems Engineering Office (SEO) is developing two cloud-computing data

services prototypes which facilitate discovery, access, processing, and analysis of space-based data from Earth-observing satellites. The first of these prototypes was delivered in June 2014 for the Asia-Rice project to support the use of radar data in Indonesia. The second prototype, to be developed in 2015, will allow testing of radar processing methods across multiple JECAM test sites. These projects are essential in ensuring data access for multiple users with diverse computational resources, and are an important contribution toward global agricultural monitoring.

Bradley Doorn,
NASA



Selma Cherchali,
CNES



Global Forest Observation Initiative (GFOI)

The CEOS Space Data Coordination Group (SDCG) for GFOI continues to provide active support to the GEO flagship for forest monitoring. The main threads and priorities for the group these past months have been

- Development of a 3-year Work Plan (to support the inputs to the new CEOS Work Plan and to ensure a well planned future for the Space Data Component of GFOI) and its endorsement by Principals at the SIT meeting in April 2015.
- Development of a plan for space data supply to the GFOI Research and Development (R&D) Component. This foresees systematic dense time-series of multi-sensor data (optical, L-, C- and X-band SAR) over a limited number of study sites in order to provide information-rich datasets that fulfil the requirements for experimental analysis.
- Preparation for the GFOI Summit in Sydney in early March 2015, which will feature all GFOI components and ensure good coordination and a common purpose among the many contributors to GFOI.
- Exploration of the use of a Space Data Management System (SDMS), including the Australian data cube concept, as a solution for the application of large and complex EO data sets to the challenges of developing countries. We believe this work has promise far beyond the scope of GFOI and could help develop a philosophy for managing the vast amounts of data from new

satellite systems like Sentinel.

Stephen Briggs continues to serve as the CEOS Lead to GFOI and is ensuring our interests are represented in the ongoing delicate discussions around the proposed transition of the GFOI office and its functions to FAO. As of February 2015, we have no dedicated staff in Geneva, but plans are in the process to restore GFOI staff support for the future.



Stephen Ward & Brian Killough
Forest Observations near Bergen

Stephen is currently Head of Earth Observation Programme Planning and Coordination, based at ESA's headquarters in Paris. In this role he is responsible for the overall coordination of EO programmes and their internal and external interfaces. Previous to this post he was for many years Head of the Department of Earth Observation

Stephen Briggs,
CEOS Lead for GFOI,
ESA



Science, Applications & Future Technologies of ESA where he was responsible for the exploitation of ESA EO missions (for science, public sector, including Copernicus, and commercial applications), future EO technologies programme, studies relating to future missions, interface between ESA's EO missions with user communities (including consultation, managing requirements and providing scientific advice to the Agency), and ensuring scientific support and providing application expertise in the development and exploitation phase of all missions and programmes. He remains also ad personam adviser to DG on strategy, science and policy.

Before joining ESA in 2000, Stephen worked as Director, Earth Observation British National Space Centre & Head, Earth Observation NERC, UK (1994-1999); Head, Remote Sensing Applications Development Unit, NERC/BNSC (1986-1994); Senior Scientist, NERC Thematic Information Systems (1983-1986); and Lecturer, Dept of Physics, Queen Mary College London (1982-1983).

Stephen has a B.Sc (First Class Honours) in Astronomy, and a Ph.D. in Astrophysics from the University College London. He is an Elected Fellow of University College London (2006). He has 70+ papers in journals, proceedings and books.

A Message from the CEOS Chair

Dear CEOS colleagues, Dear friends.

These days, we can start our day by watching weather forecasts on TV and plan our travel in detail by using high definition maps over mobile networks. We cannot imagine our daily life without Earth observation information from satellites; but we know it was a long journey to arrive at these capabilities.

2014 marked the 30 year anniversary of CEOS – being established in September 1984 with only 7 organizations. Now we have 31 Members operating 112 satellites and 24 Associates using data from those satellites. When I think of those early days, I feel like I am living in a completely different age. I would like to express my appreciation for the past efforts made by CEOS agencies - it is my honor to take the Chairmanship for the 30th milestone year, following the strong leadership of EUMETSAT.

In recent years, CEOS agencies have worked hard to establish and progress a number of important new

Working Groups - on climate, disasters, capacity building and data democracy, all with comprehensive management documents and work plans. And the recent achievements of individual CEOS agencies are also remarkable – with successful launch of 9 missions including number of meteorological satellites in 2014, those are GPM, Sentinel-1A, DMSP F-19, ALOS-2, OCO-2, Meteor-M N2, AISSat-2, Himawari-8 and CBERS-4. In 2015, CEOS agencies plan to launch 29 missions! We can safely say that the CEOS garden in a full bloom season. We can anticipate unprecedented amounts of data from Earth observation satellites. We will be harvesting them and proceed to the next step.

In this particular period, I believe the new role that CEOS has to fulfill in our society is to present solutions for the societal challenges that we face.

Of course, CEOS has been cooperating with GEO in order to investigate difficult global issues such as climate change, global warming and increasing natural disasters. Research activities by the CEOS Working Groups and Virtual Constellations have

**Shizuo
Yamamoto,**

JAXA,

2014-2015 CEOS Chair



played a big role toward the goal of the GEOSS - but its realization still seems distant.

As the CEOS chair of 2015, my intention is to develop this new role for, building on our solid 30 year foundations. I would like to do this work together with all of you and expand the value-add from CEOS - by not only providing data and information, but by creating solutions for societal challenges and delivering them to stakeholders and decision makers.

Finally, the 29th CEOS Plenary will be held in Kyoto, Japan in the first week of November - followed by a Seminar in Tokyo. I look forward to seeing all of you in the 1000-year-old capital of Japan and to sharing its beauty as well as our achievements and harvest of the coming year.



14-18 March 2015
Sendai, Japan

Please see WGDisasters Report on page 5

Meeting Calendar

As of March 2015

Activities	2015											
	January	February	March	April	May	June	July	August	September	October	November	December
CEOS Plenary and CEOS SIT (Strategic Implementation Team)				▲30-4/1 SIT-30 & Side Meetings Paris, France					▲15-17 SIT-TW & Side Meetings Darmstadt, Germany		▲4-6 CEOS 29th Plenary Kyoto, Japan	
CEOS VCs and CEOS TFs (Virtual Constellations and Task Forces)		▲2-7 SDCG-7 & GFOI Summit Sydney, Australia	▲23-4/1 ACC VC-11 Frascati, Italy					▲20-24 SST VC-4 & GHRSS-16 Noordwijk, The Netherlands				
CEOS WGs			▲10-12 WGDisasters-3 Tokyo, Japan ▲18-20 WGCAPD-4 Pretoria, S.Africa ▲23-27 CEOS-CGMS WGClimat-5 from Space Week, SCOPE-CM Meeting Geneve Switzerland		▲6-8 WGCY-39 Berlin, Germany ▲10-12 WGISS-39 Tsukuba, Japan				▲8-10 WGDisasters-4 Frascati, Italy			
GEO related Activities (Group on Earth Observations)		▲19-21 GEO IPWG Meeting Geneve Switzerland			▲4-6 2014 GEO Work Plan symposium and Implementation Board Meetings Geneve, Switzerland ▲27-29 Blue Planet Symposium Cairns Australia					▲11-12 GEO XII Plenary, Ex-com & side meetings Mexico City, Mexico ▲13 GEO XII Ministerial Summit		
Others	▲4-8 95th American Meteorological Society Meeting (AMS) Phoenix, Arizona, USA		▲14-18 WCDRR 2015 Sendai, Japan		△19-21 IOVWST Meeting & Ocean Surface Vector Wind VC Portland, Oregon, USA						▲9-13 2nd COSPAR Symposium For du Iguaco, Brazil	

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

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