

## MINUTES OF THE 27<sup>th</sup> CEOS PLENARY MEETING

5<sup>th</sup>-6<sup>th</sup> November 2013  
Montreal, Canada

### Main Outcomes and Actions from the 27<sup>th</sup> CEOS Plenary:

1. Endorsed the membership of the **Vietnam Academy of Science and Technology (VAST, Member)** and **Geoscience Australia (GA, Associate)**.
2. Endorsed the proposed **CEOS Self Study** documents, including the **CEOS Terms of Reference, Strategic Guidance, Governance and Processes**, and the Terms of Reference of several **core CEOS functions**.
3. Endorsed the **updated Virtual Constellation Process Paper**.
4. Received an update on the **Copernicus data policy**, expected to be **free and open**.
5. Agreed that CEOS would by 15<sup>th</sup> November provide its inputs on the draft GEO Ministerial Declaration and draft Vision for GEO 2015, and that it would **formulate a response to the outcomes of the GEO Ministerial at SIT-29**.
6. Received updates on the **GEO Water Cycle Report**, the **Blue Planet** task, the **GEO Biodiversity SBA**, and the **Carbon Task Force**, anticipating possible future engagement.
7. **Approved Iceland** as a new **Permanent Geohazard Supersite**, and requested a recommendation to SIT-29 on the process for endorsing future Supersites.
8. Endorsed the **CEOS Disaster Risk Management Earth observation requirements**, and agreed to consolidate CEOS Agencies' response for its three pilots (floods, seismic risks and volcanoes).
9. Endorsed the creation of a **new standing Working Group on Disasters**, with ESA and CSA as its initial Chair and Vice Chair respectively.
10. Received an update from the **Space Data Coordination Group for GFOI** on the status of the Global Baseline Strategy, and the formulation of new Space Data Services.
11. Endorsed the **CEOS Acquisition Strategy for GEOGLAM Phase 1**.
12. Endorsed the creation of a **joint CEOS-CGMS Working Group on Climate**, adopting un-amended the Terms of Reference endorsed by the CGMS Plenary (CGMS-41).
13. Adopted the **Montreal Statement**, attached as an Appendix to these minutes.

## Tuesday 5<sup>th</sup> November: Work Plan Implementation Day

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### 1 Welcome and Opening Remarks

The Chair, Luc Brûlé (CSA), opened the meeting and welcomed participants to the 27<sup>th</sup> CEOS Plenary and to Canada. He welcomed the CSA President, Retired General Walter Natynczyk, to the opening session of the CEOS Plenary.

Walter Natynczyk added his welcome to Montreal and to Canada, and noted the strong contribution that CEOS has made in advancing the cause of the peaceful use of space around the world. He thanked Luc, Marie-Josée Bourassa, and the rest of the CSA team for their work in leading CEOS and preparing the Plenary. He reflected on CEOS's role in adapting to a time when satellite data and derived information is becoming more and more ubiquitous. He also noted the evolution of CEOS from delivering, to now optimising the application of satellite data streams to the challenges facing society.

Luc invited a tour de table for participants to introduce themselves. The list of participants is provided as an Annex to the minutes.

Luc added some CEOS Chair perspectives on the 27<sup>th</sup> CEOS Plenary, reviewing the membership and main strengths and assets of CEOS. He noted that CEOS has 107 missions, and 286 instruments currently operating (as of February 2013). He summarised the 2013 CEOS Chair Priorities:

- Support the implementation of the CEOS Self-Study action plan;
- Support the development of the GEO post 2015 objectives;
- Initiate the development of 2013 CEOS Work Plan with an horizon of 3 years; and
- Sustained emphasis on: Impact of Climate Change on polar regions; and, Improving Disaster Risk Management through closely coordinated actions

Luc noted that CEOS needs to continually consider leadership sustainability and continuity – including both the CEOS and SIT Chair role, as well as important executive functions like the CEOS Executive Officer (CEO). In particular, he invited agencies to consider nominating for the SIT Vice Chair, and DCEO roles.

Luc reviewed the key decisions anticipated from the 27<sup>th</sup> CEOS Plenary:

- Membership applications from Geosciences Australia and Vietnam Academy of Science and Technology;
- Endorsement of the CEOS Strategic Guidance and Governance and Processes documents;
- Endorsement of the CEOS Virtual Constellation Process Paper (updated in 2013);
- The creation of a permanent Working Group on Disasters, and the way forward on Disaster pilots, the “Response to EO requirements”, and the “Recovery Observatory”;
- Endorsement of the GEOGLAM Phase 1 Space Data Acquisition Strategy;
- Endorsement of a joint CEOS-CGMS Working Group on Climate;
- The Phase 1 and 2A of the SST comparison campaign and the detailed definition of SST (pilot) Operational Validation Project;
- Endorsed continuation of *ad hoc* Teams; and
- Endorsement of the CEOS Montreal Statement.

## 2 Membership Matters

Luc Brûlé (CSA/CEOS Chair) introduced the two applicants for CEOS membership, and each organization then presented a summary of their applications, in particular those that are consistent with the mission of CEOS.

**Vietnam Academy of Science and Technology (Member):** Tuan Pham (VAST) presented a summary of VAST, noting that it was established in 1975. It has more than 700 scientists, 2600 staff members, and produces more than half of Vietnam’s annual scientific publications. Currently VAST is running three major satellite projects: VNREDSat 1 (multispectral, launched May 2013); VNREDSat 1b (hyper spectral, launch 2017); and, VNSC (LOTUSat 1, LOTUSat 2, SAR, launch 2017 and 2020 respectively).

Satellite	Type	2013	2014	2015	2016	2017	2018	2019	2020	
VNREDSat 1	Multi-spectral	▶								
VNREDSat 1b	Hyper-spectral					▶				
LOTUSat 1	SAR					▶				
LOTUSat 2	SAR							▶		

VNSC is currently working on the design and construction of a space centre, supported by JAXA. Vu Anh noted that VAST would be interested in participating in a number of aspects of CEOS, including the Virtual Constellations, Working Groups, and SIT activities, and sees CEOS as a very good way for VAST to develop its capacity and international linkages.

**Geoscience Australia (Associate Member):** Adam Lewis (GA) presented a summary of GA, noting that it employs 730 staff, and its priorities are: resources and energy; marine estate management; and, community safety. GA operates a number of ground segment assets including calibration and validation facilities, data and communications infrastructure, and two national ground stations. The capacities of GA include expertise (science, emergency management, calibration/validation), and data (management of datasets, 2 Pb of data, high performance computing). GA supports a free and open data policy where possible, and has a history of contributing to CEOS activities in the past including Working Groups, SDCG/GFOI, and GEOGLAM.

Adam stressed that GA can contribute to CEOS through: facilities and location in support of the goal of closing observational gaps; making data and products freely available where possible; operational perspectives supporting responsiveness to global Earth observation needs; and, experience in operating sea and ground-based observatories and data integration.

The VAST and GA representatives left the room, and Luc opened the floor for comment:

- Shizuo Yamamoto (JAXA) spoke in favour of the membership requests from both VAST and GA, and noted that JAXA has cooperated with both organisations on activities in Asia.
- Alex Held (CSIRO) expressed the support of CSIRO for both GA and VAST, noting that VAST has been active in the Asia-Pacific region for some time now, and that CSIRO and GA have worked, and continue to work together extensively.

With no objections expressed, the Chair welcomed VAST as the newest Member of CEOS, and GA as the newest Associate Member, and invited their representatives to join the remainder of the Plenary. He encouraged both organisations to actively participate in relevant CEOS groups and activities.

27-1	Ensure addition of Vietnam's EO satellite programmes to the CEOS Database (aka the MIM).	ESA CEOS MIM team	January 2014
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### 3 Coordination of Open Action Items from 26<sup>th</sup> Plenary

Stephen Ward (for CEOS Chair) reviewed the status of actions from the 26<sup>th</sup> CEOS Plenary, and no specific comments were raised.

No.	Action	Due Date/Status
26-1	CEOS SEO to revise the CEOS membership list online to reflected ESSO's Associate Membership. SEO and CEO to ensure that CEOS Associate-P and Associate-C contact lists are also updated.	COMPLETE
26-2	CEOS agencies encouraged to submit nominations for the role of Deputy CEOS Executive Officer (DCEO).	November 2012 No nominations received.
26-3	CEOS agencies are invited to nominate volunteers for the CSS key documents steering committees.	COMPLETE
26-4	SEO, with input from CEO, to establish an on-line record of attendance for all CEOS meetings.	COMPLETE
26-5	CEO to lead an update and expansion of the CEOS presentation set and to provide a broad distribution of the information for CEOS agencies and stakeholders.	COMPLETE Uploaded to the CEOS website.
26-6	CEOS-GEO action leads encouraged to provide regular updates on task status and progress.	OngoingCOMPLETE
26-7	OCR-VC leads to circulate the IN-SITU OCR White Paper via the SIT Chair Team and CEOS Agencies are encouraged to engage in implementation with the VC.	Ongoing COMPELTE
26-8	CEOS Carbon Task Force to deliver their report in time for review at SIT-28.	Issued for review 1 Oct – comments due by 25 Nov. CTF will report at Plenary
26-9	SIT Chair to liaise with the SDCG and LSI leads to consider their respective roles and responsibilities, and reconcile their terms of reference, within the framework of the CSSII, and to report progress to SIT-28.	COMPLETE Land Surface Study Group established and to report to SIT-29
26-10	CEOS agencies to nominate a point of contact to the CEOS Supersites Coordination Team	December 2012 Jörn Hoffman reports no additional POCs have been nominated. SCT was looking for CRESDA, ISRO, and CDTI but have not received any confirmation of participation.
26-	CEOS agencies invited to provide feedback on the GEO Water Cycle	COMPLETE

11	Strategy Report progress and to nominate (to Water SBA Coordinator, Osamu Ochiai) expert reviewers to engage in the review phase.	
26-12	SIT Chair, within the framework of the CSSII, to establish mechanisms for the selection and prioritization of new initiatives, and to review the consistency of all ad hoc structures with the permanent CEOS mechanisms (WGs, VCs, etc).	ANTICIPATED COMPLETE AT PLENARY
26-13	CEOS agencies encouraged to review the report of the Polar Space Task Group and to provide comments on the nature and structure of CEOS engagement and appropriate roles and responsibilities for the space systems coordination.	COMPLETE Yves Crevier reported at SIT-28.
26-14	Ad hoc DRM Working Group to prepare an Implementation Plan that addresses the DRM Study Report actions 1, 5, 6, 7 and 8.	COMPLETE
26-15	Ad hoc DRM Working Group to prepare a Strategic Observation Plan.	COMPLETE
26-16	CEOS agencies interested to join the DRM activities are invited to contact the Ad hoc DRM Working Group co-leads (CSA and ESA) to nominate a representative.	COMPLETE
26-17	WGClimate will work with CEOS contacts to determine the most appropriate national/agency contacts in support of the ECV Inventory survey and to encourage a comprehensive response to the survey.	COMPLETE
26-18	CEOS Agencies to provide their agency responses to the ECV Inventory survey.	COMPLETE
26-19	The MIM Team to work with WGClimate to ensure the latest contact details for the ECV Inventory are available and shared.	COMPLETE
26-20	WGClimate to circulate their revised set of Terms of Reference to CEOS agencies, reflecting the addition of the Climate SBA coordinator duties to the WGClimate remit.	COMPLETE Revised ToR are on the CEOS website
26-21	WGClimate Chair, in cooperation with CEOS SEC, to propose a way forward for engagement in the GFCS process.	COMPLETE
26-22	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 SIT-28	COMPLETE
26-23	Agencies interested in providing the next WGCapD Vice-Chair (from 2014, to subsequently serve as Chair from 2016) should forward nominations to WGCapD Chair.	COMPLETE Vice Chair nomination received from SANSAs.
26-24	CEOS Chair will work with WGCV Chair to advertise the need for WGCV Subgroup leadership roles to be staffed.	COMPLETE
26-25	CEOS agencies encouraged to liaise with their national delegations to COP-18 to secure their supportive response to the CEOS presentation - including with regard to continuity of space-based observations and full and open data sharing to support climate monitoring and research.	COMPLETE

#### 4 CEOS Self-Study Process

Michael Freilich (NASA/SIT Chair) introduced the CEOS Self Study (CSS) process, noting that one of the motivations for the CSS was for CEOS to carefully examine and discuss its past and future. He summarised the objectives and the major milestones of the process.



**CSS Objectives:**

- ✓ To identify, articulate and evaluate CEOS successes and strengths in achieving real coordination in space-based Earth observations for societal benefit.
- ✓ To identify successes as well as areas for improvement
- ✓ To identify potential new CEOS initiatives for the next 5-7 years
- ✓ To strengthen engagement and involvement of a broad range of CEOS members through participation in a shared activity

Major Milestone / Accomplishment	Date
CEOS Self-Study (CSS) is conducted	February – October 2011
Key recommendations are accepted	2011 CEOS Plenary
Implementation Phase 1: Develop Inputs/Options	November 2011- March 2013
Key Decisions on Options	SIT-28
Implementation Phase 2: Strategic Documents	March 2013 – October 2013
Strategic Documents presented for approval	2013 CEOS Plenary

**Timeline:** 2011 → 2012 → 2013

Process flow: CEOS Self-Study → CSS Implementation (CSSII) Phase 1 → CSSII Phase 2 → CSS

Mike noted that the following documents resulting from the CSS are being presented to Plenary for approval:

- CEOS Terms of Reference (Revised [Rev]);
- Strategic Guidance (New);
- Governance and Processes (New); and
- Terms of Reference of Key Entities:
  - o CEOS Chair (Rev);
  - o CEOS Secretariat (New);
  - o CEOS Strategic Implementation Team Chair (SIT Chair, Rev);
  - o CEOS Executive Officer (CEO) (New);
  - o CEOS Systems Engineering Office (SEO) (New).

#### 5 CEOS Self-Study Strategic Documents

Brian Killough (NASA/SEO) presented a summary of the CEOS Self-Study (CSS) outputs:

- CEOS Terms of Reference (ToR);
- CEOS Strategic Guidance (SG) (~10 year life);
- CEOS Governance & Processes (GP) (~5 year life); and
- Element ToRs for: CEOS Chair, CEOS Secretariat, SIT Chair, CEOS Executive Officer (CEO), CEOS Systems Engineering Office (SEO).

Brian noted that future amendments to the CEOS ToR, SG and GP strategic documents will require endorsement at a SIT Meeting and approval at a subsequent Plenary Meeting. Brian also noted that future efforts to amend one or more of the documents should involve a review of the others because they are interrelated and mutually supporting. Brian reviewed the highlights from each document.

#### CEOS Terms of Reference:

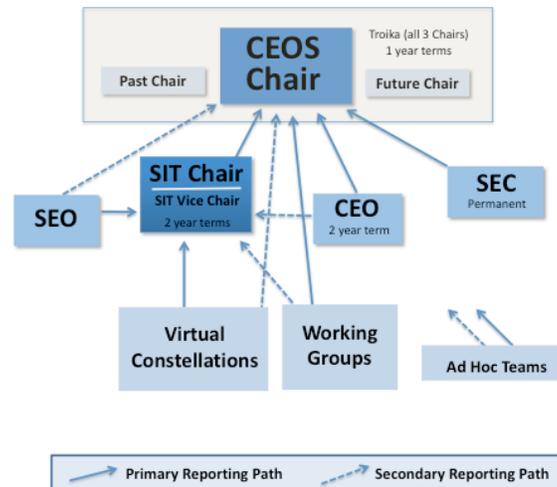
- Largely based on the existing ToR established in 1984, with minor amendments;
- Contains high-level guiding information that is further detailed in the Strategic Guidance (SG) and Governance and Processes (GP) documents;
- Clearly defines “CEOS Agencies”: Members (operating or at least Phase-B space based programs) and Associates (coordination bodies with significant activities that support CEOS objectives);
- Provides a definition of temporary “*Ad Hoc* Teams” to investigate specific areas of interest; and
- The ToR cover: Introduction and Background; CEOS Mission and Objectives; Goals; Value to Stakeholders; Approach; Definition and Measures of Success; and, Challenges, Opportunities, and Strategic Direction.

**Strategic Guidance document:**

- CEOS objective: Optimize benefit of Earth observations, serve as focal point for international coordination, exchange information;
- Reduce observational gaps, improve coordination of Earth observations, promote Data Democracy by improving access and use of data, and Respond to user needs;
- Projects should have defined requirements, milestones, schedule and management plans;
- The SG document contains: Introduction and Background; CEOS Mission and Objectives; Goals; Value to Stakeholders; Approach; Definition and Measures of Success; and, Challenges, Opportunities, and Strategic Direction.

**Governance and Processes document:**

- External Decision – Decisions made by Principals at Plenary, consistent with Strategic Guidance document. Example: New CEOS-CGMS Climate Working Group;
- Internal Decision – Decisions made by Principals at SIT or Plenary, consistent with SG, ToRs and Work Plans. Example: Continuation of an *Ad Hoc* Team;
- Working Level Decision – Decisions made by WG/VC leadership after appropriate consultation with CEOS Chair or SIT Chair. ToRs, VC Process Paper and Work Plans guide the decisions. Example: Termination of an activity;
- The GP document contains: Introduction and Background; Organizational Roles and Responsibilities; Decision-Making Process; Major Meetings; Membership and Participation; Annex 1 – Current list of Working Groups, Virtual Constellations, *Ad Hoc* Teams (updated SIT-WS); Annex 2 – Current list of CEOS Agencies and year of acceptance; and, a CEOS organisation chart.



Brian noted that the SIT Chair Team and the CSS Steering Committee are asking Plenary for formal endorsement of the complete set of documents (CEOS ToR, Strategic Guidance, Governance and Processes, and 5 CEOS element Terms of Reference). Luc Brûlé (CSA/CEOS Chair) opened the floor for discussion:

- Alain Ratier (EUMETSAT) congratulated the CSS team on the creation of the set of documents, and noted that EUMETSAT fully endorses them.
- Pascale Ultré-Guéraud (CNES) expressed the support of incoming SIT Chair and is glad to have the framework in place at the start of their SIT Chair term.
- Mary Kicza (NOAA) expressed NOAA’s support for the endorsement of the documents.
- Ruth Boumphrey (UKSA) expressed UKSA’s support, noting that these documents really do help clarify CEOS activities.
- Stephen Briggs (ESA) expressed ESA’s appreciation to the team, and noted that this has been a very important process to clarify what CEOS is doing for both new, and experienced CEOS participants.
- Stefano Bruzzi (ASI) thanked Mike Freilich and the team for producing these documents, and noted that this has been a valuable review of where CEOS is and where it is going in future.
- Conrado Varotto (CONAE) thanked Mike and the team, noting that before this process, many stakeholders were asking where CEOS is going – and this study has helped to address this question.
- Wenjian Zhang (WMO/Space) noted that the section on stakeholder expectations is quite useful.
- Per-Erik Skrovseth (NSC) noted that these documents help greatly in understanding what CEOS does, and are helpful background for new members.
- Rajeev Jaiswal (ISRO) expressed ISRO’s support for the documents, noting that the process started in Lucca and continued through the Bangalore Plenary.
- Alex Held (CSIRO) noted that he has been using the CEOS Self-Study documents to brief Australian government in advance of CSIRO’s 2016 CEOS Chair Term.
- Satoko Miura (JAXA) thanked the team, and noted that the documents are quite useful as WGISS Chair. She also noted that WGISS has started its own “self study”.

***Luc noted that there is resounding consensus in the Plenary in support of these documents. They were declared endorsed by Plenary.***

Mike noted that these are CEOS’s documents, and in a very real sense all of CEOS has participated in the three years of the study. The CEOS community worked together on a sustained basis to prepare these documents.

Brian presented several CSS follow-up initiatives for consideration in 2014:

- As part of the CSS, it was agreed that a rolling 3-year CEOS Work Plan would be developed in early 2014 (to be updated annually). Development of the new Work Plan will be led by Kerry Sawyer (NOAA/CEO). Mike Freilich suggested that Lena Braatz, who assisted the SIT Chair team with the CSS documents, may be able to lend support;
- The CEOS website will need revisions to accurately reflect the new strategic document content;
- CEOS does not have a formal “tactical” process document for new CEOS Working Groups or new CEOS Initiatives, and the development of such a process document is proposed; and
- CEOS does not currently have a consistent system for document endorsement and configuration management, and should consider options for the future to maintain a record of the organization’s key documents.

Stephen Briggs noted that CEOS handling of new initiatives was one of the points that gave rise to the CSS, and that CEOS needs to be careful about how we manage resources.

<b>27-2</b>	<b>Develop the 1<sup>st</sup> version of the new 3-year CEOS Work Plan.</b>	<b>CEO</b>	<b>mid-March 2014</b>
<b>27-3</b>	<b>Update the CEOS website to reflect the new terms of reference and governance decisions of CEOS Plenary.</b>	<b>SEO, in consultation with CEOS SEC</b>	<b>December 2013</b>
<b>27-4</b>	<b>Prepare a process paper(s), with the support of a writing team, for: (a) CEOS Working Groups; and, (b) for guidance on proposals for new CEOS initiatives. (Interest expressed by Mark Dowell, Marie-Josée Bourssa, Ivan Petiteville, Brian Killough, and Steven Hosford.)</b>	<b>CEO, in consultation with CEOS SEC</b>	<b>SIT-29</b>
<b>27-5</b>	<b>Develop and present a recommendation for a CEOS document configuration management system.</b>	<b>SEO, in consultation with CEOS SEC and CEO</b>	<b>SIT-29</b>

## **6 Introduction of the CEOS Montreal Statement**

Luc Brûlé (CSA/CEOS Chair) introduced the Montreal Statement, noting that it follows the model of the past two Plenary statements identifying key CEOS stakeholders, and reaffirming the mission of CEOS. A few discussion points were raised, and the statement was revised:

- Ivan Petiteville (ESA) asked what CEOS planned to do with the document, noting that there are a number of forums in 2014 such as the GEO Ministerial Summit in which the statement will be useful.
- Alain Ratier (EUMETSAT) stressed that this statement should focus on what was achieved in Montreal, and does not necessarily need to cover all on-going CEOS activities.
- Stefano Bruzzi (ASI) stressed that if the audience is external, then we do not need to include internal structural details like the number of CEOS Virtual Constellations or Working Groups.
- Brent Smith (NOAA) noted that for the past couple of years, CEOS has been producing a one-page print version which has been circulated to external stakeholders (e.g., GEO Plenary) to explain CEOS activities. It was noted that this was expected again this year.
- Wenjian Zhang (WMO/Space) noted that the statement was useful in facilitating communication with the outside world, and suggested that GFCS should be specifically noted.

## 7 Annual Progress on CEOS Implementation of GEOSS Space Segment

Mike Freilich (NASA/SIT Chair) presented the annual update on CEOS contributions to the GEO Work Plan from the SIT Chair. He noted that the report consisted of two parts – highlights of CEOS contributions to the GEO 2012-2015 Work Plan; and, an update on the CEOS Virtual Constellations (VCs).

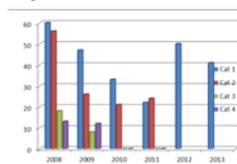
### CEOS Contributions to the GEO 2012-2015 Work Plan

He summarised the eight elements of the 2013 CEOS Work Plan, highlighting related GEO 2012-2015 Work Plan actions.

1. Climate Monitoring and Research [*five CEOS-GEO Actions related*];
2. Carbon Observations [*five CEOS-GEO Actions related*];
3. Food Security [*two CEOS-GEO Actions related*];
4. Disaster Risk Management [*10 CEOS-GEO Actions related*];
5. Capacity Building and Data Availability and Access [*10 CEOS-GEO Actions related*];
6. CEOS Support to Further Key Stakeholder Initiatives [*eight CEOS-GEO Actions related*];
7. Continued and Enhanced CEOS Outreach to Key Stakeholders [*one CEOS-GEO Actions related*]; and
8. Adoption of Recommendations from the 2011 CEOS Self-Study.



- 47 Actions for 2013
- 4 CLOSED 
- Of the 43 remaining open Actions, 33 have been updated within the past two months



- CEOS is identified as:
- Component Lead for sixteen (16) of the proposed 58 Components
  - Component POC for six (6) Components
  - Contributor for twelve (12) Components
  - Task Coordinator for two (2) Tasks
  - Implementation Board Member for two (2) Boards (Two on IIB and one on SB)

Mike noted that Brian Killough leads the IN-01-C2 Component, which includes priority actions on the promotion of rapid development of CEOS Virtual Constellations, establishing and upgrading ground station capacity in Africa for CBERS (INPE), establishing actions securing ECV data from satellites (CEOS/CGMS WGClimate), and promoting space missions to fill gaps from the loss of key missions (e.g., Envisat, ALOS). He emphasized that the VCs are the key delivery mechanisms of CEOS, noting that 33% of the CEOS-GEO actions utilize VCs to accomplish their tasks.

### **Update on the CEOS Virtual Constellations (VCs)**

Mike reviewed some of the accomplishments of the CEOS VCs, noting that the presumption of the SIT Chair team has been that VCs have an essential role supporting delivery of GEOSS space segment outcomes, consistent with the CSS recommendations. He noted that for this reason, the SIT Chair Team sought to strengthen feedback and support mechanisms for the VCs through dedicated VC workshops at the CEOS SIT-27 and SIT-28 meetings, during regularly scheduled SIT Chair telcons with VC leads, and systematic representation of VC outcomes and issues on Secretariat telecons.

Mike reviewed the key VC-related outcomes expected from Plenary:

1. Update on progress of the VCs during 2013;
2. A 2013 update to the “CEOS Virtual Constellations Process Paper” in relation to the Group on Earth Observations (GEO);
3. Individual terms of reference for each of the seven VCs; and
4. Harmonised statement of accomplishments by 2015 of VCs (and WGs).

Mike reviewed the key outcomes, progress, and issues for each of the VCs. He noted there is some risk surrounding the LSI-VC, and progress of the LSSG – and suggested that the incoming CEOS Chair and SIT Chair teams should pay special attention to this issue in the months leading to SIT-29 in April 2014.

Mike introduced the revised VC Process Paper, noting that it has been updated based on comments from the VC Teams, and CEOS Secretariat. The main revisions are:

- Section 3 revised to include descriptions of all 7 of the current constellations;
- Sections 4 and 5 revised to simplify/shorten the process of proposing a new constellation, and include definition of Terms of Reference in that process;
- Section 6 revised to indicate the ongoing role of SIT in managing the VCs, not just in relation to approving new VCs; and
- Annex 3 presents a template for the Terms of Reference proposed to be developed to characterise all the existing and new VCs.

Mike asked Plenary to endorse this update to the Process Paper, and a discussion followed:

- Pascale Ultré-Guérard (CNES) suggested changing the requirement for the VC meetings/telecons with the SIT Chair from “3 per year” to “regular” meetings outside of main meetings.
- Pascale also noted, and agreed with Mike’s point on LSI and the LSSG;
- Alain Ratier (EUMETSAT) emphasized the need to ensure that the output of the CEOS Work Plan is consistent with the outputs from the VCs.
- Mary Kicza (NOAA) supported the need for continuous contact with the VCs. Mike noted that the feedback from this contact was often quite actionable, and the issues were tracked through the team. He also noted that the group telecon was useful for everyone to see the

common themes across the Constellations. Pascale confirmed the CNES SIT Chair Team is considering two sets of round robin calls outside the SIT and SIT Workshop meetings.

- Stephen Ward (NASA) noted that often the outcomes of the VC calls are used as the headline issues for the SIT Chair Team and CEOS to address.

***Mike noted that the revision proposal on call frequency by Pascale, and asked that the VC Process Paper be endorsed by Plenary –no objections were raised.***

Mike presented a summary of the harmonization activity for all VC Terms of Reference, noting that only the most recent VCs (SST, OCR) have a formal characterisation of their scope and objectives. He noted that the consistent set of ToRs seeks to help CEOS better characterise, communicate and manage the ambitions of the current and future VCs.

Mike noted that the VC Leads have been asked to work with a ToR template with common elements to ensure consistency, but have freedom to emphasise the unique nature and foci of the individual VC activities. The emphasis is on outcomes and deliverables and in specifying the implementation and coordination issues to be addressed by the SIT. Included is a clear characterisation of the relevant space segment – including identification of the core missions as priorities for coordination.

He noted, that despite plans to present the full set of ToRs at Plenary, the task has not yet been completed, and the NASA SIT Chair is requesting an extension until 23<sup>rd</sup> December 2013 for submission of the documents to CEOS Principals.

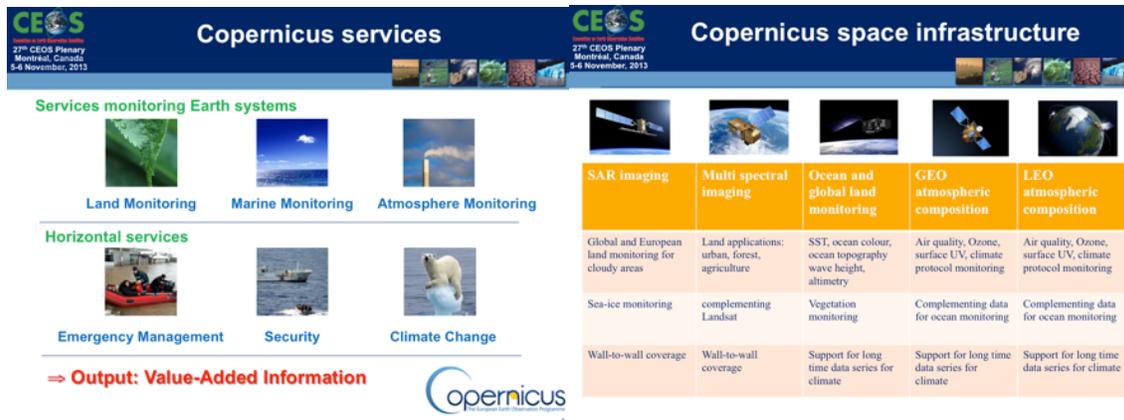
He summarised the 2015 CEOS deliverables to GEO, noting they are dependent on the VC ToRs. The purpose of developing a consolidated statement of deliverables is to support the case for GEO and the GEOSS beyond 2015 by providing evidence of achievements and return on investment during the first 10 years. This deliverable, approved by Principals and delegated to the SIT Chair at SIT-28, is important because CEOS as a collective and its member agencies’ space programs are major donors and stakeholders in the GEO process and have committed substantially to it.

Adrian Simmons (GCOS) thanked Mike for acknowledging the issue of the gap in atmospheric limb sounding. Adrian noted this gap has been called out in several contexts, including the GCOS 2010 Implementation Plan.

<b>27-6</b>	<b>Deliver to CEOS SEC: (a) the consistent set of TORs for the 7 CEOS VCs; and (b) the 2015 statement of deliverables for the GEOSS.</b>	<b>Outgoing NASA SIT Team</b>	<b>23<sup>rd</sup> December 2013</b>
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## **8 Update on Copernicus**

Reinhard Schulte-Braucks (EC) provided an update on Copernicus, which aims to be a source of information for policymakers, scientists, business and the public at large. It addresses several global needs, including management of the environment, mitigation of the effects of climate change, and ensuring civil security. The implementation utilises a user-driven programme of services, comprising an integrated Earth Observation system (combining space-based and *in-situ* data with Earth System Models, delivered to users by six service providers).



The slide is titled 'Copernicus services' and 'Copernicus space infrastructure'. It features a grid of service categories and a table of satellite capabilities.

**Services monitoring Earth systems:** Land Monitoring, Marine Monitoring, Atmosphere Monitoring.

**Horizontal services:** Emergency Management, Security, Climate Change.

**Output: Value-Added Information**

**Copernicus space infrastructure table:**

SAR imaging	Multi spectral imaging	Ocean and global land monitoring	GEO atmospheric composition	LEO atmospheric composition
Global and European land monitoring for cloudy areas	Land applications: urban, forest, agriculture	SST, ocean colour, ocean topography wave height, altimetry	Air quality, Ozone, surface UV, climate protocol monitoring	Air quality, Ozone, surface UV, climate protocol monitoring
Sea-ice monitoring	complementing Landsat	Vegetation monitoring	Complementing data for ocean monitoring	Complementing data for ocean monitoring
Wall-to-wall coverage	Wall-to-wall coverage	Support for long time data series for climate	Support for long time data series for climate	Support for long time data series for climate

Reinhard noted that several of the acquisition plans CEOS is currently working on (e.g., GFOI, GEOGLAM, and Disaster Risk Management) rely on data from the Sentinel missions which comprise the Copernicus system. He also noted that the data policy for Copernicus is currently being discussed, with some debate from European industry regarding distribution of data for areas outside of Europe. The EC has a clear position of full, free and open access to Sentinel data.

A discussion followed:

- Mike Freilich (NASA/SIT Chair) asked if it was possible for Reinhard to communicate information in the negotiations that is not necessarily public to the CEOS Chair. Reinhard indicated that it may be possible to share the information once the negotiations have terminated but before an official release is sent (e.g., that the agreement has been written on paper, but not formally released).
- Stephen Briggs (ESA) welcomed the fact that Reinhard has been able to come here to make direct statements on the Copernicus data policy, and hopes that this is the beginning of further integration of the EC into the CEOS family – as actors in a very comprehensive space program.
- Ruth Boumphrey (UKSA) agreed with the importance of the EC presence, noting that many in the UK see Copernicus as a program not just for Europe, but for the world. She stressed that it is important for European data to be available not just for European users, but for global users.
- Reinhard noted that ESA, EUMETSAT, and many other institutions have been involved, and that in the future EC will cover an increasing percentage of the cost (e.g., of future units).

27-7	<b>Inform CEOS Chair as to the decision on the Sentinels Data Policy by the European Parliament – noting the dependence of several key CEOS initiatives on a free and open data policy.</b>	EC	December 2013
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## 9 CEOS Inputs to GEO Ministerial and Post-2015

Brent Smith (NOAA) outlined the plan for the session, and then introduced Barbara Ryan (GEO Secretariat Director, by phone). Barbara introduced Michel Deshayes who is at Plenary on behalf of GEO, and has just started as a secondee serving as the GEOGLAM Project Office lead.

She noted that the CEOS relationship with GEO is serving as a model for other GEO Participating Organisations (POs). She stressed that for GEO Post-2015, global monitoring initiatives will continue to be cornerstones of GEO, with GEO Members coming together to work observational gaps, working with POs like CEOS. Barb also highlighted the need to strengthen the effort of the GEOS Common Infrastructure (GCI), expressing how access to information in GCI has gone up hundred-fold by contributions from CWIC.

Brent reviewed the background of CEOS participation in the GEO Post-2015 Working Group, noting that the CEOS *ad hoc* Team on GEO Post-2015 had drafted a series of CEOS recommendations on the future of GEO that the CEOS and SIT Chairs provided to GEO in May 2012, with a second set of recommendations provided in May 2013.

Brent noted that Monday's side discussion on Future GEO had come up with the following recommendations for Plenary to discuss in connection with the 30<sup>th</sup> September request to the CEOS Chair for CEOS to address comments on the draft Ministerial Declaration and Draft Vision for GEO 2025 document being prepared for the January GEO Plenary/Ministerial.

- 1) Emphasizing System of Systems integration (as opposed to stovepipes);
- 2) The GEO role in environmental governance requires collaboration with other global programs/UN structures;
- 3) The integration of the space segment with *in situ* observations (e.g., building upon IGOS) is vital; and
- 4) The adoption by the GEO Ministerial within two years of a Post-2015 GEO Implementation Plan.

Brent outlined the next steps for CEOS regarding future GEO (GEO X & Ministerial), including: developing the CEOS response due to the GEO Secretariat Director by 15<sup>th</sup> November; identifying the CEOS delegation to GEO-X and Ministerial; reviewing final GEO Plenary/Ministerial documentation, coordinating CEOS positions, as necessary, with space agency interests of other GEO Members, Participating Organizations; preparing the CEOS exhibit, CEOS one-pager, CEOS entity inputs into GEO Showcases and co-sponsored side events; and, remaining abreast of post-GEO Plenary/Ministerial developments with regard to post-2015 GEO, a new Implementation Plan, annual Plenaries, and a late 2015/early 2016 Ministerial.

Brent also noted decisions to be taken by CEOS Plenary:

- Continue the *ad hoc* Team (to be addressed in Agenda Item 26); and
- Direct development and provision by 15<sup>th</sup> November of CEOS response to GEO, re: draft Ministerial Declaration and draft Vision for GEO 2025 document.

A discussion followed, moderated by Kerry Sawyer.

- Stephen Briggs (ESA) noted that the most important point is not the detail, but rather where GEO is going in the next three years. He noted that at GEO Plenary in January, Ministers will be asked to endorse a continuation of GEO. The next major break point will be end 2015 or early 2016, when the Ministers will (possibly) meet again to endorse the next GEO decadal Implementation Plan. In 2016 there will be a formal review of what happened in the first 10-years. He stressed that the recent discussion points noted by Brent are key to the discussion.
- Barbara noted that there will be a progress report on the first 10 years of GEO conducted in support of the next GEO decadal Implementation Plan development.
- Kerry Sawyer (NOAA/CEO) noted that the next key milestone is 15<sup>th</sup> November, and the submission of CEOS inputs to the Ministerial Declaration and GEO post-2015 recommendations.

- Stephen asked if it would be useful for CEOS to write less formally, describing the discussion at Plenary, noting the four important points raised – this could be done in a letter from perhaps the incoming Chair. Barbara agreed this would be helpful.
- Alain Ratier (EUMETSAT) asked if Brent’s points 1 and 3 go together. Stephen Briggs noted that they are distinct – that the first point refers to developing a common system of system-based requirements, while the third point is more along the lines of continuation of IGOS-type activities.
- Stefano Bruzzi (ASI) asked if CEOS is happy with the vision for GEO outlined in the materials presented. Mike Freilich (NASA/SIT Chair) suggested that before considering if we’re happy, we should consider what form a sharper input from CEOS would take.
- Barbara noted that the expectation is that the GEO Post-2015 team will stand down after Plenary, and the expectation is that the Plenary will propose that an Implementation Team be established to develop a new plan for GEO for the next decade. There is also a possibility that GEO may want to have a very senior level steering committee that would be tasked with thinking strategically about the GEO post-2015.

Kerry referred the discussion to Brent’s two suggested decisions, and the discussion continued.

- Luc Brûlé (CSA/CEOS Chair) noted that he would support continuation of the CEOS *ad hoc* team on post-2015 GEO. He noted that with each iteration, the materials from the Post-2015 Working Group are improving, and that there are many inputs the CEOS *ad hoc* team needs to manage.
- Stephen Briggs noted that it is not clear what the CEOS *ad hoc* team on post-2015 GEO should do after next week (i.e., after the CEOS input is provided to GEO on 15<sup>th</sup> November.) Alain agreed, noting that CEOS should start afresh based on what comes out of the GEO Ministerial.
- Mike Freilich suggested that it may be better to have a team up and running, rather than having to spin a team up again after the Ministerial. Stephen Briggs noted that the time between GEO Ministerial and SIT-29 (when a team could be spun back up) is not a major time consideration in the context of the overall post-2015 process.
- Mary Kicza (NOAA) noted that there needs to be a decision on the continuation of the group, but that either way she feels we’ll be OK.
- Luc noted that the decision seems to be leaning towards not to continuing the *ad hoc* team, but rather to leave the issue to the incoming CEOS Chair and SIT Chair teams to consider. He suggested that the CEOS comments be sent by the 15<sup>th</sup> of November by way of a letter from the new CEOS Chair and SIT Chair.
- Alain suggested stressing the point that CEOS will need to react to the outcomes of the GEO Ministerial meeting in January.
- Barbara noted that the Ministerial Declaration is the only document that will truly be negotiated by Ministers, and that if CEOS is represented in this process (either via the CEOS delegation or national delegations), then it would hear the discussion first hand.

<b>27-8</b>	<b>Conclude and submit via SIT and CEOS Chairs the CEOS response to GEO re draft Ministerial Declaration and Draft Vision for GEO 2025 document.</b>	<b>Post-2015 GEO ad-hoc Team</b>	<b>COMPLETE (sent on 15 Dec 2013)</b>
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## 10 GEO Water Cycle Report

Chu Ishida (JAXA) presented the background and current status of the GEO Water Cycle Report, noting the strong heritage with IGOS-P activities. He noted that the timeline for producing the water cycle report is focused on providing it by the GEO Summit in January 2014. The purpose of the report is: to update and synthesize the available information about the status of water cycle observations and information systems since the IGWCO report of 2004; to describe a strategy for water cycle observations and information that will enable the short-term GEO objectives and the long-term community goals to be achieved; to provide CEOS, GEO, WMO and other agencies with guidance about strategies for water cycle observations, information systems, interoperability, capacity building, etc.; and, to propose major initiatives that will advance this overall concept.

The main points of the report are:

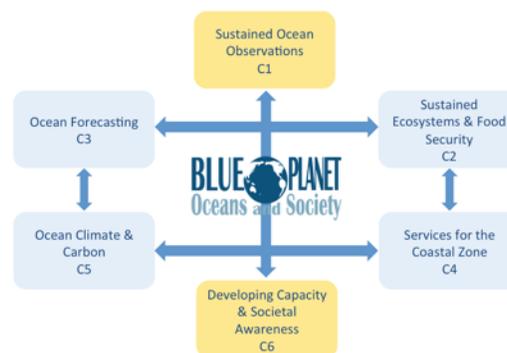
1. Show requirements to provide a framework for guiding decisions regarding priorities and strategies for the maintenance and enhancement of water cycle observations;
2. Show the importance of improving welfare of the poor in developing countries through more effective water management, and to support the climate change adaptation agenda;
3. Clarify the user needs of precipitation, soil moisture and evapo-transportation based on a GEO assessment;
4. Show existing and planned observational systems for water cycle and water quality variables and the gap; and
5. Recommend actions to solve the issues.

Chu noted that after the GEO Water Strategy report is adopted by the GEO as a basis for its post-2015 water activities, it is expected that GEO will request CEOS (satellites) and WMO (*in situ*) to develop action plans for how they will contribute to the new water programme. This request will likely be in place by SIT-29.

Wenjia Zhang (WMO/Space) noted that if requested, WMO would be more than happy to respond. Mary Kicza thanked the team for their efforts. Chu noted that he will provide this feedback to the leadership of the GEO Water Cycle project.

## 11 GEO Blue Planet

Kerry Sawyer (NOAA/CEO) presented a summary of the Blue Planet Task, noting that she has promoted the task with the oceans-related VCs, and that it touches all nine GEO SBAs. She also noted that Blue Planet was included as one of the Expected Outcomes in the 2013 CEOS Work Plan – “Determination of the level and scope of engagement of the four ocean-related Virtual Constellations in the GEO Blue Planet Task”.



Kerry noted that the Blue Planet Task description is currently being revised by GEO, and CEOS would welcome the opportunity to review the revised Task and Components to ensure that CEOS contributions are accurately reflected. A discussion followed.

- Per-Erik Skrovseth (NSC) suggested the inclusion of Copernicus marine services, and Mark Dowell confirmed that this is mentioned explicitly in the task description.
- Adrian Simmons (GCOS) asked if the required atmospheric input data needs to be included, and Mark confirmed that the lead (Mike Bell) has captured these.

## 12 Biodiversity SBA

Martin Wegmann (DLR/Biodiversity SBA Expert) reviewed the current status of remote sensing and biodiversity activities, noting that the links are not always obvious – though there are a number of relevant examples. He reviewed some of the recent activities related to the Biodiversity SBA.



**2007: Biodiversity topic identified by CEOS**  
**2010: DLR was approached as Biodiversity coordinator**  
**Since 2010/11:**

- Several workshops on challenges and potential
- Dialogue on potential CEOS contributions to the GEO Biodiversity Observation Network (GEO BON)

**Goals:**

- Identify needs and shortcomings of Earth Observations for biodiversity and conservation
- Improve inter-community exchange
- Trigger new developments between communities
- Define future needed developments, new products as well as sensors

Domain	Essential Climate Variables	Essential Biodiversity Variables								
Atmospheric (over land, sea and ice)	Surface: Air temperature, precipitation, air pressure, surface radiation budget, wind speed and direction, water vapour Upper air: Earth radiation budget (including solar irradiance), upper air temperature (including MSU radiances), wind speed and direction, water vapour, cloud properties Composition: Carbon dioxide, methane, ozone, other long-lived greenhouse gases, aerosol properties	None listed								
Oceanic	Surface: Sea surface temperature, sea level, currents, ice Sub-surface: Temperature, salinity, phytoplankton	<table border="1"> <thead> <tr> <th>Variable</th> <th>Measurement and availability</th> <th>Relevance</th> <th>Relevance for ECV targets</th> </tr> </thead> <tbody> <tr> <td>Sea surface temperature</td> <td>Global coverage, high temporal resolution</td> <td>Indicator of ocean warming and acidification</td> <td>Target 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15, 10.16, 10.17, 10.18, 10.19, 10.20, 10.21, 10.22, 10.23, 10.24, 10.25, 10.26, 10.27, 10.28, 10.29, 10.30, 10.31, 10.32, 10.33, 10.34, 10.35, 10.36, 10.37, 10.38, 10.39, 10.40, 10.41, 10.42, 10.43, 10.44, 10.45, 10.46, 10.47, 10.48, 10.49, 10.50, 10.51, 10.52, 10.53, 10.54, 10.55, 10.56, 10.57, 10.58, 10.59, 10.60, 10.61, 10.62, 10.63, 10.64, 10.65, 10.66, 10.67, 10.68, 10.69, 10.70, 10.71, 10.72, 10.73, 10.74, 10.75, 10.76, 10.77, 10.78, 10.79, 10.80, 10.81, 10.82, 10.83, 10.84, 10.85, 10.86, 10.87, 10.88, 10.89, 10.90, 10.91, 10.92, 10.93, 10.94, 10.95, 10.96, 10.97, 10.98, 10.99, 10.100</td> </tr> </tbody> </table>	Variable	Measurement and availability	Relevance	Relevance for ECV targets	Sea surface temperature	Global coverage, high temporal resolution	Indicator of ocean warming and acidification	Target 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15, 10.16, 10.17, 10.18, 10.19, 10.20, 10.21, 10.22, 10.23, 10.24, 10.25, 10.26, 10.27, 10.28, 10.29, 10.30, 10.31, 10.32, 10.33, 10.34, 10.35, 10.36, 10.37, 10.38, 10.39, 10.40, 10.41, 10.42, 10.43, 10.44, 10.45, 10.46, 10.47, 10.48, 10.49, 10.50, 10.51, 10.52, 10.53, 10.54, 10.55, 10.56, 10.57, 10.58, 10.59, 10.60, 10.61, 10.62, 10.63, 10.64, 10.65, 10.66, 10.67, 10.68, 10.69, 10.70, 10.71, 10.72, 10.73, 10.74, 10.75, 10.76, 10.77, 10.78, 10.79, 10.80, 10.81, 10.82, 10.83, 10.84, 10.85, 10.86, 10.87, 10.88, 10.89, 10.90, 10.91, 10.92, 10.93, 10.94, 10.95, 10.96, 10.97, 10.98, 10.99, 10.100
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Terrestrial	River discharge, water use, ground-caps, permafrost and seasonally frozen vegetation types, fraction of above leaf area index (LAI), biomass, fire	<table border="1"> <thead> <tr> <th>Variable</th> <th>Measurement and availability</th> <th>Relevance</th> <th>Relevance for ECV targets</th> </tr> </thead> <tbody> <tr> <td>Forest cover and loss</td> <td>Global coverage, high temporal resolution</td> <td>Indicator of land use change and deforestation</td> <td>Target 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15, 10.16, 10.17, 10.18, 10.19, 10.20, 10.21, 10.22, 10.23, 10.24, 10.25, 10.26, 10.27, 10.28, 10.29, 10.30, 10.31, 10.32, 10.33, 10.34, 10.35, 10.36, 10.37, 10.38, 10.39, 10.40, 10.41, 10.42, 10.43, 10.44, 10.45, 10.46, 10.47, 10.48, 10.49, 10.50, 10.51, 10.52, 10.53, 10.54, 10.55, 10.56, 10.57, 10.58, 10.59, 10.60, 10.61, 10.62, 10.63, 10.64, 10.65, 10.66, 10.67, 10.68, 10.69, 10.70, 10.71, 10.72, 10.73, 10.74, 10.75, 10.76, 10.77, 10.78, 10.79, 10.80, 10.81, 10.82, 10.83, 10.84, 10.85, 10.86, 10.87, 10.88, 10.89, 10.90, 10.91, 10.92, 10.93, 10.94, 10.95, 10.96, 10.97, 10.98, 10.99, 10.100</td> </tr> </tbody> </table>	Variable	Measurement and availability	Relevance	Relevance for ECV targets	Forest cover and loss	Global coverage, high temporal resolution	Indicator of land use change and deforestation	Target 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15, 10.16, 10.17, 10.18, 10.19, 10.20, 10.21, 10.22, 10.23, 10.24, 10.25, 10.26, 10.27, 10.28, 10.29, 10.30, 10.31, 10.32, 10.33, 10.34, 10.35, 10.36, 10.37, 10.38, 10.39, 10.40, 10.41, 10.42, 10.43, 10.44, 10.45, 10.46, 10.47, 10.48, 10.49, 10.50, 10.51, 10.52, 10.53, 10.54, 10.55, 10.56, 10.57, 10.58, 10.59, 10.60, 10.61, 10.62, 10.63, 10.64, 10.65, 10.66, 10.67, 10.68, 10.69, 10.70, 10.71, 10.72, 10.73, 10.74, 10.75, 10.76, 10.77, 10.78, 10.79, 10.80, 10.81, 10.82, 10.83, 10.84, 10.85, 10.86, 10.87, 10.88, 10.89, 10.90, 10.91, 10.92, 10.93, 10.94, 10.95, 10.96, 10.97, 10.98, 10.99, 10.100
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Martin noted that the process of developing “Essential Biodiversity Variables” (akin to the Essential Climate Variables) has started, but is still maturing. He summarised some of the recent achievements of the community, including several joint community workshops, journal articles, and the identification of challenges relating to community interaction, data access, data adequacy, data continuity, and knowledge/skills. He reviewed the results of a recent survey on the current usage of remote sensing in the biodiversity community. He noted a number of synergies with other CEOS activities that could be considered:

- Harmonization of land cover (change) information;
- Forest cover and loss;
- Agricultural expansion;
- Urban sprawl;
- Disaster mapping;
- Atmospheric conditions (wind direction, speed);
- Continuity of Earth observation data sets;
- Request of global hyperspectral and LiDAR data sets; and
- Training on remote sensing data analysis.

Stephen Briggs (ESA) noted that the coupling of biodiversity and remote sensing is clearly important, and thanked Martin for his presentation.

## Wednesday 6<sup>th</sup> November: Progress Reporting & Strategic Discussion Day

### 13 Geohazard Supersites

Klaus Schmidt (DLR) presented a summary of the Geohazard supersites initiative, which aims to enrich knowledge of geological hazards by empowering the global scientific community through collaboration between space and *in situ* data providers, and the cross-domain sharing of data and knowledge. This includes the provision of easy and free-of-charge access to comprehensive satellite and ground-based geophysical data sets.

Klaus reviewed previous CEOS Plenary decisions related to the Geohazard Supersites.

- Approved process for Supersite selection (2012);
- Accepted Hawai'i as first Permanent Supersite (2012); and
- Tasked Supersites Coordination Team (SCT) to coordinate CEOS contributions and facilitate coordinated access to data.

He also reviewed the main 2013 accomplishments.

- CEOS-proposed selection process for Supersites accepted in GEO;
- SCT agreed on making metadata for data provided to Supersites accessible through standard web services (CSW);
- Proposal to accept new Supersite for Iceland; and
- 7 additional Supersite proposals under review.

Klaus noted that there are two requests for Plenary this year.

1. Approve Iceland as a new Permanent Supersite; and
2. Approve delegation to the SIT for additional Supersites to be reviewed prior to April 2014, to avoid delays in support.

He also noted that an additional seven sites are currently being evaluated, and will be presented for endorsement at SIT-29.



**For decision: CEOS Plenary...**

- ... **accepts** the Iceland Supersite Proposal and agrees to support it by making available data according to the request in the proposal and up to the limits listed below.
- ... **requests** that the Supersites Coordination Team inform the PoC for the Iceland Supersite of this decision and the procedures of ordering and accessing the data

**Indicative data resources committed**

- CEOS intends to support this Supersite with these resources:

(ASI)	300 scenes/yr by end 2015 plus 500 past acquisitions	COSMO/Skymed
(CNES)	2 coverages @ 2.5m, tbc 1 coverage per volcano, tbc	SPOT-5 Pleiades Radarsat-2 TerraSAR-X
(CSA)	160 scenes/yr by end 2015	
(DLR)	250 scenes by end 2015 plus 550 past acquisitions	
(ESA)	complete archive any available acquisition	ERS-1, -2, Envisat Sentinel-1, -2
(JAXA)	tbd	ALOS-2
(NASA)	any available acquisition tbd	EO-1 ASTER

**For Plenary Action**

**Status Summary**

- **Future Supersite Coordination Team activities and milestones**
  - Complete implementation of coordinated access to Supersites metadata (best effort, expected 2014)
  - Evaluate new Supersite proposals, by SIT 2014:
    - Marmara Sea / NAFZ, Turkey
    - Mt. Etna, Italy
    - Mt. Vesuvius / Campi Flegrei, Italy
    - San Andreas Fault
    - Piton de la Fournaise volcano, Reunion Island
    - Equatorial volcanoes
    - New Zealand (volcanoes)
- **Main Issues**
  - Engagement of science community still maturing

A discussion followed.

- Stephen Briggs (ESA) noted that the prospect of a jump from the current two sites to 10 in the SIT-29 timeframe seems like a big change. Klaus noted that these sites would be added in conjunction with the broader disasters topics being presented (i.e., the WG on Disasters, and the Disaster Risk Management (DRM) Acquisition Strategy).

- Chu Ishida (JAXA) noted that JAXA plans to respond at SIT-29 within the framework of DRM activities.
- Pascale Ultré-Guérard (CNES) asked about the process, and wondered why the Plenary should approve specific Supersites rather than a global acquisition strategy as for other projects (e.g. GFOI), and whether the decision for each site should be delegated. Kerry noted that when the process for accepting supersites was proposed by the supersite coordination team they suggested having Plenary endorse the supersites. This process was accepted at the 2012 Plenary. She also noted that the Supersites Coordination Team (SCT) should be subsumed within the proposed WG on Disasters. This WG would then logically provide reporting to Plenary. The criteria for Supersite selection has already been approved by Plenary, thus enabling the SCT/WGDisasters to make the decision on which sites should be Supersites.
- Mike Freilich remarked that the incoming SIT Chair might wish to shepherd the process in preparation for SIT-29.
- Ivan Petiteville noted the good synergy between the CEOS DRM pilots (volcanoes and seismic risks) that focus on both Iceland and some of the seven sites currently being evaluated.

Kerry recommended endorsing item #1 (Iceland as a permanent Supersite), and deferring the decision on #2 (approval of additional Supersites) until SIT-29. Both of these points were agreed by Plenary.

#### **14 Disaster Risk Management (DRM) Acquisition Strategy**

Ivan Petiteville (ESA), on behalf of the CEOS *ad hoc* team on Disaster Risk Management (DRM), presented the CEOS DRM Acquisition Strategy. He noted that there is an increasing interest in DRM from large international organisations (e.g., UN, WB, EC) and countries, and that there is a growing dedicated resource base for DRM.

Satellites have a unique role to play to support DRM, however, there is a lack of awareness of potential satellite contributions. Users need to see benefit of EO through dedicated pilots, and that coordinated action can lead to results greater than sum of individual agency's contribution. The approach proposed is to build on existing initiatives (e.g., Charter, Supersites, Sentinel-Asia).

The proposed observation strategy aims to coordinate CEOS acquisitions to reduce overlap and eliminate gaps in support of three focused pilots: floods, seismic risks, and volcanoes. The focus for 2014-2016 is to address the needs of the pilots, with a longer-term vision for post-2016 to be developed based on the outcomes of the pilots.

Ivan (with support from Simonetta Zoffoli, ASI on Volcanoes) summarised the three pilot activities, noting that they have been developed by three separate teams made up of 35 experts from 10 CEOS Agencies, and 26 from non-CEOS organisations (user and practitioner community at local/national or regional levels). These activities seek maximum reuse of existing projects, initiatives and assets, and are aligned with GEO. The demonstration period 2014-2016 is centred around showing significant outcomes for the 2015 World Conference on Disaster Risk Reduction (WCDRR) to be hosted by the UN in Japan.

**Pilots Overview**

Pilot	Team Co-Leads	Deliverables
Floods	NASA, S. Frye NOAA, B. Kuligowski	<ul style="list-style-type: none"> <li>Global Flood Dashboard (single access for multiple existing systems)</li> <li>Three regional pilots showcasing end user benefit of frequent high spatial resolution observations (Caribbean, Southern Africa, Mekong/Java)</li> </ul>
Seismic Risks	ESA, P. Bally DLR, J. Hoffmann	<ul style="list-style-type: none"> <li>Demonstrator for EO-based global strain map (main focus on Turkey, Himalayas and Andes)</li> <li>Exploitation platform for large data set analysis (strain map, supersites)</li> <li>Rapid scientific products for 4 to 6 earthquakes per year (&gt;M5.8)</li> </ul>
Volcanoes	USGS, M. Poland ASI, S. Zoffoli	<ul style="list-style-type: none"> <li>Demonstrate feasibility of systematic global monitoring in regional arc (Latin America)</li> <li>Develop new EO-based monitoring products at supersites</li> <li>Real-time in-depth monitoring of one '100-year' category major eruption</li> </ul>
Recovery Observatory	CNES, A. Giros	<ul style="list-style-type: none"> <li>Provide multi-year EO-based database to support recovery from one catastrophic disaster</li> </ul>

**Synergy With Existing GEO Activities**

Ivan also noted that the team is also developing the “Recovery Observatory” concept, building on the work of the Charter on Space and Major Disasters and of CNES in response to the 2011 Haiti earthquake. The focus of this concept is on sharing Earth observation data for longer periods of time in support of recovery from catastrophic disaster.

Steven Hosford (CNES) gave an overview of the Recovery Observatory concept.

**Recovery Observatory – the idea**

**Recovery Observatory – the proposal**

**Recovery Observatory Implementation:**

- Oversight Team (CNES, ESA, JAXA, NASA, ASI) created summer 2013
- Proposes **ONE** Observatory as part of Observation Strategy 2014-2016
- Builds on success of Charter, Sentinel-Asia and KAL-Haiti project
- Next steps:**
  - Completed detailed analysis
  - Preparation (conditions for triggering, infrastructure establishment, generic planning)
  - Cold storage
  - Triggering
  - Operations (3-5 years)
  - Closing

**Detailed analysis to be presented by Oversight Team at SIT April 2014.**

He noted that CEOS Agencies are well organized in the response phase immediately after the disaster, but in the recovery phase, activities are not as well coordinated and are mostly *ad hoc*. The objective is to improve access to Earth observation data in the recovery phase.

Ivan summarised the status of the CEOS DRM activities, noting that there are several preliminary items which will be finalised at SIT-29.

**CEOS DRM Observation Strategy : Content & Status**

• **CEOS DRM Observation Strategy** (1<sup>st</sup> issue at SIT WS, 2<sup>nd</sup> issue at CEOS Plenary, final issue at 2014 SIT Meeting) **contains:**

- **Thematic Pilots definition,**
- **Recovery Observatory definition**
- **Pilots EO Requirements;**
- **Response from Agencies' to EO requirements** (list of relevant satellite missions/instruments and products with Strategic Data Acquisition Plan).

**CEOS participation in 2015 WCDRR**

**WCDRR Preparation meeting with JAXA – Japan Cabinet Office and Japan Foreign Ministry** (September 26, 2013):

- Good contacts established with WCDRR local host (Thanks to GEO SEC)
- Active participation of CEOS welcome by Japanese officials
- Still perception gap as to positioning of space assets in HFA.

**Meeting B.Ryan (GEO) and M.Walstrom (UN ISDR)** (Sep. 2013):

- CEOS DRM presented to UN ISDR
- M.Walstrom's advice:
  - Local users are still missing the capabilities to access and exploit the information derived from EO satellite data
  - EO satellite data needs to be integrated in traditional disaster management processes.

**A Task Force led by JAXA (Chu) will define and implement a strategic approach for the CEOS' participation in the WCDRR** (e.g. side event, exhibition, conference declaration, ..) **and CEOS' contribution to the HFA2 (2015-2025).**

- call for membership

He also noted that there is a need for CEOS to coordinate its participation at the WCDRR, and that a Task Force lead by JAXA (Chu Ishida) will define and implement a strategic approach for the CEOS participation. This may include a side event, exhibition booth, conference declaration, and other items highlighting the CEOS contribution to the DRM framework for 2015-2025 (HFA2).

Ivan reviewed the decisions for CEOS Plenary:

Approve:

1. Pilot definitions (i.e., Users’ *High-level Information Needs* and *Detailed EO requirements*);

Endorse way forward recommendations for 2014:

2. CEOS Agencies’ “*Response to EO requirements*” and “*Recovery Observatory*” proposal to be both consolidated at 2014 SIT meeting;
  - Data & Products delivery to Pilots’ Users from 2014 SIT meeting onwards; and
3. Prepare CEOS participation at 2015 WCDRR.

A discussion followed.

- Adam Lewis (GA) raised the question of the relationship with the Charter, and competition with existing institutions. Steven Hosford noted there is no intention to re-invent anything that exists, but rather to cover a time scale outside the current scope of the Charter. The Charter currently covers 2-3 weeks post-disaster, and the aim would be to extend that (via the Recovery Observatory) to 3-5 years. Adam asked if this would be administratively linked to the Charter, and Steven noted that they will be reaching out to the Charter in the coming weeks to discuss the proposal and how best to link it to the Charter.
- Per-Erik Skrovseth (NSC) stressed the importance of looking at existing data coordination on the ground, and Ivan noted this is being discussed within the team.
- Shizuo Yamamoto (JAXA) noted that DRM is the highest priority area for the JAXA Earth observation program. ALOS-2 will launch soon, and it is expected it will be able to support these activities. He also noted that JAXA has tried to link its activities to the 2015 WCDRR conference.
- Sandile Malinga (SANSA) expressed SANSA’s support for the DRM strategy, noting that recovery operations in response to floods are of particular interest to South Africa.

Luc noted that the Pilot definitions have been approved by Plenary (decision #1), and the 2014 way forward recommendations are endorsed (items for endorsement #2 and #3).

27-9	<b>Develop the full Recovery Observatory proposal for the approval.</b>	<b>WGDisasters</b>	<b>SIT-29</b>
27-10	<b>Propose a way forward for the 2015 World Conference on Disaster Risk Reduction (WCDRR).</b>	<b>JAXA</b>	<b>SIT-29</b>
27-11	<b>Prepare for approval the strategic data acquisition plan in response to the floods, seismic risk, and volcanoes pilots’ EO requirements.</b>	<b>WGDisasters</b>	<b>SIT-29</b>

## 15 Disasters SBA Report

Frank Lindsay (NASA) presented the current status and updated progress on the disaster activities supported within CEOS. Currently CEOS is engaged in ten disaster actions/activities. He also reviewed the Disasters SBA accomplishments for the year.



**Objective of the presentation**

- This presentation is intended to provide the Plenary with the current status and updated progress on the disaster activities supported within CEOS.
- Currently CEOS is engaged in ten disaster actions/activities:

C1_1: Satellite data Needs and Gaps:	PoC Guy Seguin, NASA
C1_2: Architecture:	PoC Karen Moe, NASA
C1_3: Global Observation Strategy for DRM:	PoC Ivan Petiteville, ESA
C1_4: Hyogo Framework stakeholder:	PoC Chu Ishida, JAXA
C1_5: Use of Satellite data for coastal zones:	PoC Guy Seguin, NASA
C2_1: Global web-based volcanic ash service:	PoC Claus Zehner, ESA
C2_2: Supersite proposal evaluation:	PoC Jörn Hoffmann, DLR
C2_4: Supersite data provision coordination:	PoC Jörn Hoffmann, DLR
C3_1: Caribbean Satellite Disaster Pilot:	PoC Stuart Frye, NASA
C3_2: Southern African Flood and Health Pilot:	PoC Stuart Frye, NASA

- C1\_3 & C1\_4 on DRM was presented under item 19
- C2\_2 & C2\_4 on Supersite was presented under item 18

**Disasters SBA Report Accomplishments**

1. Report on the progress of the Disaster Task was presented at the GEO Symposium (June 2013)
2. A Gap analysis was completed for flood observations
3. A high-level model/architecture was developed for Disaster management
4. A Global Observation Strategy was developed under the DRM actions (item 20)
5. Utilization of Satellite data for Coastal Zone was analysed (moved to the Blue Planet GEO Task)
6. Supersites proposals were received and evaluated by the Supersites Coordination Team (item 22)
7. The 2013 season of the Caribbean Satellite Disaster Pilot was completed
8. Flood event in Namibia was used for a Cal/Val exercise
9. GEO WP review was completed for the Disaster Task

Frank reviewed the plan for the Disasters SBA-related actions.

- Four actions will be closed; C1\_1, C1\_2, C1\_5, C2\_2;
- Five actions will be remapped in the 2014 Work Plan; C1\_3, C1\_4, C2\_1, C3\_1, C3\_2; and
- A new action to address the response of CEOS to new demands/needs and gaps to support disasters will be formulated.

He noted that challenges and future questions include: the leadership and organisation of activities under the new Working Group; and, the role of CEOS in the GEO Disaster Task.

## 16 Report from the Disasters Study Group

Steven Hosford (CNES) presented a report on behalf of the Disasters Study Group, noting that the group was established at SIT-28 to study CEOS disasters-related activities in the mid- to- long-term. The starting point for Study Group discussions were the recommendations of the CSSII, Roles and Responsibilities Topical Team – and four options were ultimately considered:

- A. Suppress the *ad hoc Working Group on DRM* and embed all of the existing CEOS Disaster activities within the *CEOS Disaster SBA Team*;
- B. Suppress the *CEOS Disaster SBA Team* and embed all of the existing CEOS Disaster activities within the *ad hoc Working Group on DRM*;
- C. Suppress both the *CEOS Disaster SBA Team* and the *ad hoc Working Group on DRM* and transfer all activities to a new *WG on Disasters*; and
- D. Leave "as is".

After discussion within the Disasters Study Group, and the broader community, option C was agreed – the transfer of all disasters activities to a new Working Group on Disasters. Steven noted that this parallels the “Climate” theme within CEOS: both themes of long-term strategic importance to CEOS; both themes are characterised by a complex context of national, regional and global actors; both themes have a broad range of potential external clients; and, many established space actors or groupings already contribute to focused aspects of both themes. The Study Group felt that a standing Working Group would be most effective in constituting a common “CEOS voice” on disasters-related issues.

Steven noted that there are three recommendations for Plenary decision.

1. Creation of a new standing Working Group on Disasters;
2. Adoption of the proposed Terms of Reference for this Working Group; and
3. Nominations of Chair (volunteered by ESA) and Vice-Chair (volunteered by CSA)

A discussion followed.

- Mary Kicza (NOAA) expressed NOAA’s support for all three recommendations, noting that this will serve to consolidate CEOS disasters work going forward.
- Stephen Briggs (ESA) noted that this issue has been discussed at length by the community, and that ESA supports all three recommendations presented.

Luc Brûlé (CSA/CEOS Chair) noted that three decision points were agreed. He noted that ESA (Ivan Petiteville) and CSA (Stéphane Chalifoux) will be the Chair and Vice Chair of the group respectively. Ivan Petiteville (ESA) thanked the community for their support, and noted that the first focus will be on confirming the objectives of the group.

<b>27-12</b>	<b>Prepare the structure of the new CEOS Working Group on Disasters (WGDisasters), encompassing the current work on Supersites coordination, Disaster Risk Management (three pilots, acquisition strategy), the Recovery Observatory proposal, the Disasters SBA, and other CEOS disasters-related activities.</b>	<b>WGDisasters</b>	<b>SIT-29</b>
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## 17 CEOS Carbon Strategy and Implementation

Chu Ishida (JAXA) presented an update on the CEOS Carbon Strategy on behalf of Carbon Task Force Co-Chairs, Diane Wickland (NASA) and Masakatsu Nakajima (JAXA). He noted that CEOS established the Carbon Task Force (CTF) to coordinate the CEOS response to the GEO Carbon Strategy – as the *CEOS Strategy for Carbon Observations from Space*.

Chu noted a number of milestones achieved since CEOS Plenary in 2012.

- The three domain chapters have been completed: *Land; Atmosphere; and, Ocean and Inland Waters*;
- The *Integration* chapter was completed, drawing a number of cross-domain conclusions, recommendations, and actions; and
- A draft of the full report was released in September 2013 for comment by 25<sup>th</sup> November 2013.

It is expected that the report will be made available by the end of 2013 for CEOS endorsement. Chu noted that JAXA (and NIES) intend to include the *CEOS Carbon strategy* in their communications at COP-19, and at the GEO Ministerial Summit.

Several face-to-face meetings have taken place, including in conjunction with AGU 2012, SIT-28, and the SIT Technical Workshop in Pasadena, CA. These have been used as opportunities to see input on the structure, text, recommendations and actions of the report, as well as to discuss implementation and oversight mechanisms.

Chu noted that coordinating the implementation of the *CEOS Carbon Strategy* through WGClimate was discussed at the September SIT Workshop. This issue remains open.

In 2014 CEOS will need to decide on how it will implement the *Strategy*, and the first opportunity to discuss any CEOS action would be at SIT-29. The *Strategy* will make some recommendations on implementation, but a number of issues will remain to be coordinated.

A discussion followed Chu’s report.

- Mark Dowell (EC/JRC) noted that he will address the interface between the CTF/Carbon Strategy and WGClimate during the WGClimate report.
- Mike Freilich (NASA/SIT Chair) thanked the CTF for their work on the report, and urged the CEOS Secretariat to follow progress between now and SIT-29, and to provide guidance as needed.
- Stephen Briggs (ESA) noted that we should not be surprised that the report has taken time as the subject matter is very complex. He also stressed that CEOS shouldn’t underestimate the effort and resources that will be required to implement the recommendations and actions.
- Kerry Sawyer (NOAA/CEO) noted that there are over 55 actions/recommendations coming out of the report that the CEOS Agencies will have to address.

27-13	<b>Conclude the CEOS Strategy for Carbon Observations from Space in time for its promotion (as a draft) at GEO Plenary.</b>	<b>Carbon Task Force</b>	<b>GEO-X</b>
27-14	<b>Ensure a focused, comprehensive preparation of the discussion on implementation of the CEOS Carbon Strategy at SIT-29.</b>	<b>CEOS SEC</b>	<b>SIT-29</b>
27-15	<b>To develop a list of implementation options for the CEOS Carbon Strategy, including a recommended option.</b>	<b>Carbon Task Force, in consultation with WGClimate, and other stakeholders</b>	<b>SIT-29</b>

**18 Update on Global Forest Observations Initiative (GFOI) and the Space Data Coordination Group (SDCG)**

Stephen Briggs (ESA) presented a summary of SDCG, recalling the objectives of GFOI: to foster sustained availability of satellite and ground observation in support of national forest information systems; and, to support countries in the use of observations for their national forest information systems. He reviewed the four pillars of GFOI activity.

1. Methods and Guidance Documentation (Australia lead);
2. Coordination of satellite data supply (CEOS lead via SDCG);
3. R&D on technical challenges (Norway lead); and
4. Capacity Building (US lead).

He reviewed the role of SDCG in GFOI, noting that the coordination of satellite data acquisition and supply is fundamental to GFOI objectives and supports all countries’ participation in reporting. In particular, satellite data can provide: measurements of forest extend and characteristic; support to countries in GHG Reporting; and, independent verification.

The CEOS Data Strategy for GFOI comprises three elements.

**Element 1:** A baseline, coordinated global data acquisition strategy involving a number of ‘Core data streams’ that can be used free-of-charge and openly for GFOI purposes. The Global Baseline Strategy and Implementation Plan for 2013 was approved at SIT-28.

**Element 2:** Coordinated strategies for national space data services.

**Element 3:** Data supply in support of the GFOI R&D activities.

Stephen reviewed the Core mission status, noting that Landsat-8 is now fully operational and performing beyond expectations. He noted that Sentinel-1A and CBERS-3 are expected to be in operation by mid-to-late 2014, and Sentinel-2A will launch in late 2014, ramping-up operations in 2015. This increased capacity will be important in supporting the phased implementation proposed in the Global Baseline Strategy. This phasing will see the number of GFOI target countries will increasing from 15 to 51 in 2014, approximately doubling the area.



As a part of the development of Element 2, four broad categories of space data services are being considered:

- **Historical Coverage Characterisation:** support to assess archived satellite data for a given country for past years;
- **Core Data Delivery:** support for physical delivery of data;
- **Core Data Value Adding:** enhanced core data products; and
- **Data Processing:** “Data Hub” capacity to assist country generation of inputs to forest information products.

It is expected that the definition of these space data services will be further refined in the lead-up to SDCG-5 (February 2014), and will be presented for endorsement at SIT-29. The CEOS SEO has been providing significant support in the scoping of these services, and has worked on developing several prototype tools, which it may extend driven by feedback from the user community.

Stephen reviewed two of the main current challenges.

**Data availability** – 2012 represents the low-water mark for CEOS mission availability with the loss of CBERS-2, ALOS, Landsat 5, and Envisat. The successful launch of Landsat-8 has been a big step forward, and is now together with Landsat-7 the only core missions in orbit. The near-future looks positive with CBERS-3, Sentinel-1 and -2, ALOS-2 potentially in orbit within the next year.

**Data delivery and handling** – there are difficulties to deliver large data volume in areas with insufficient internet connection, and in country handling and processing of huge data volumes with their current IT infrastructure.

The SDCG-5 meeting is being planned for 25-27 Feb 2014 at ESA/ESRIN, and will include a “country day” together with FAO/UN-REDD. The main focus of the meeting will be the finalisation of SDCG deliverables for SIT-29, including:

- Global Baseline Strategy (Element 1) 2013 implementation results summary;
- Global Baseline Strategy Implementation Plan for 2014; and
- GFOI Space Data Services (Element 2) Strategy and Implementation Plan.

Stephen noted a couple of other activities that SDCG is currently considering.

- How best to support the GFOI R&D Plan (Element 3);
- Improving representation of Earth observations in the GFOI MGD; and
- Continuing close co-operation with GEOGLAM.

He also noted that SDCG (*ad hoc*) is seeking Plenary approval for an extension of their mandate for a further year.

A discussion followed.

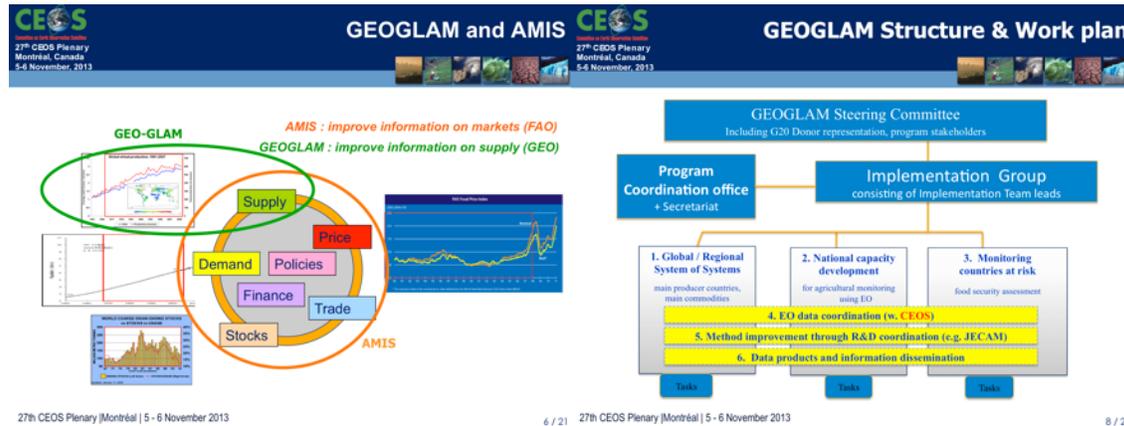
- Per-Erik Skrovseth (NSC) noted that the Space Data Services (Element 2) will touch on the issue of data that is not provided via the CEOS Agencies (e.g., not free and open, commercial, but required by countries). He noted that Norway is offering some grants for data acquisition.
- Stephen Ward (DCC) noted that SDCG is on track, and that the Global Baseline Strategy (Element 1) was an important political statement of intent and capacity. The next challenge is direct support to countries, and to show that GFOI is giving something to countries by way of data services. He noted that with respect to GEOGLAM, there is scope for convergence in future on acquisition strategies and their planning. There was a half-day at both SDCG-3 and SDCG-4 to discuss overlaps with GEOGLAM, and the discussion was productive.
- Adam Lewis (GA) noted that GA is seeing some reduction of interest in the data hub concept, and asked if this was an intentional approach. Stephen Briggs noted that this was not intentional, and that in fact this concept is being accelerated by Norway.
- Luc Brûlé (CSA/CEOS Chair) noted that there is general agreement that the SDCG should continue, though this remains to be confirmed by Plenary.

Stephen Briggs closed by noting that SDCG and GFOI provide necessary support tools for REDD+, and that the wider team supporting GFOI includes The World Bank, UN/FAO, and others.

<b>27-16</b>	<b>Prepare: (a) the Global Baseline Strategy (Element 1) 2013 implementation results summary; (b) Global Baseline Strategy Implementation Plan for 2014; and, (c) the GFOI Space Data Services (Element 2) Strategy and Implementation Plan for endorsement by SIT-29.</b>	<b><i>Ad hoc</i> SDCG for GFOI</b>	<b>SIT-29</b>
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## 19 GEOGLAM Status Update

Michel Deshayes (GEOGLAM Project Office) presented an update on the current GEOGLAM, noting that he has a mandate to run the GEOGLAM Project Office for the next three years. He reviewed the context and mandate for GEOGLAM, noting that in 2011, the G-20 decided to try and address the problem of food price volatility. This led to the initiation of the "Agricultural Market Information System" (AMIS), and the "GEO Global Agricultural Monitoring Initiative" (GEOGLAM).



GEOGLAM is a *coordination program*, aimed at supporting, strengthening and articulating existing efforts, developing capacities and awareness at national and global level, and improving availability and open access to data and disseminating information. Earth observation data coordination is one of three cross-cutting elements in the GEOGLAM Work Plan, and an area where CEOS is already making significant contributions. GEOGLAM is also substantially supported by the GEO Agriculture Community of Practice, and is made up of international and national agencies concerned with agricultural monitoring including Ministries of Agriculture, space agencies, universities, and industry.

Michel noted that two of the main accomplishments of GEOGLAM in 2013 have been the creation of an Implementation Plan for Phase 1 and 2, and the initiation of monthly global crop outlooks (the "AMIS Market Monitor"). In addition, Joint Experiment for Crop Assessment and Monitoring (JECAM) activities are continuing as the R&D element of GEOGLAM, with strong support from a number of CEOS Agencies.

Michel reviewed some of the current and future challenges.

- Continuation of Mandate for Ad-Hoc Advisory Group;
- Funding for ad-hoc advisory working group meetings, regional GEOGLAM workshops, and commercial data buys for Post-evaluation phase;
- Data pre-processing and establishment of standards; and
- Data distribution and addressing the need for near real-time data.

A discussion followed.

- Mike Freilich (NASA/SIT Chair) noted that it is wise to define the latency requirement for "near real time", and Michel clarified that for GEOGLAM this means a few days to allow for *in situ* data collection.
- Adrian Simmons (GCOS) raised the issue of meteorology inputs to yield forecasts, and asked to what extent GEOGLAM incorporates monthly and seasonal forecasts and whether this generates an additional set of data requirements. He also asked if this is integrated with the

Global Framework for Climate Services (GFCS). Michel indicated that this needs to be addressed more concisely.

- Alex Held (CSIRO) noted that the initial output from GEOGLAM is an NDVI anomaly product, which does need to be checked against ground information.
- Shizuo Yamamoto (JAXA) expressed JAXA’s support for both GEOGLAM and GFOI. He noted that JAXA is supporting the Asia-RiCE project for GEOGLAM, and that the GFOI requirements have been reflected in ALOS-2 Baseline Observation Strategy (BOS).

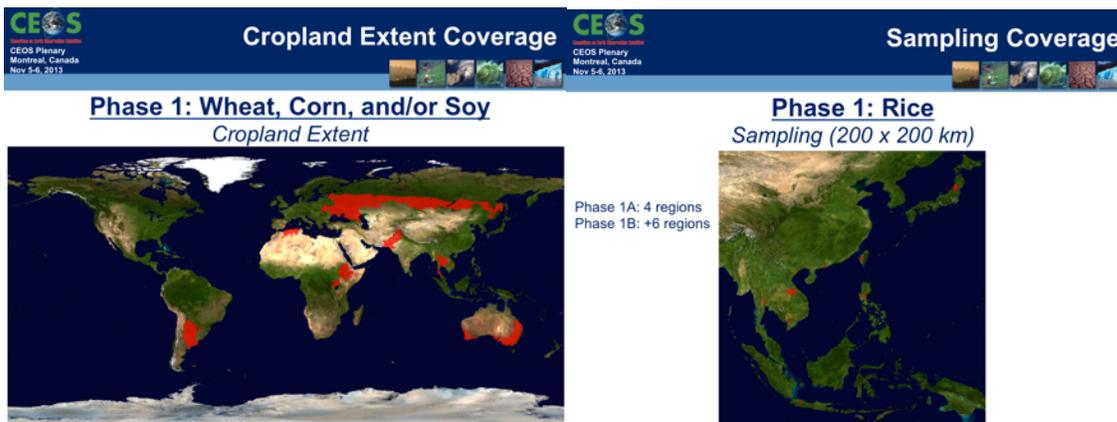
## 20 Endorsement of GEOGLAM Phase 1 Acquisition Strategy

George Dyke (CEOS *Ad Hoc* Working Group on GEOGLAM) presented the *CEOS Acquisition Strategy for GEOGLAM Phase 1*, noting that the CEOS *ad hoc* WG on GEOGLAM was established at SIT-27 to help, “further develop the space-based observations component” for GEOGLAM. The *Strategy* has been developed in response to the 2013 CEOS Work Plan (Section 6.1), and SIT-28 action 28-34.

George explained that the GEOGLAM Implementation Plan for Phase 1 and 2 was endorsed by the GEO Executive Committee in July 2013, and that the CEOS Strategy currently tries to address the minimum space data provision necessary for GEOGLAM Phase 1. The strategy also anticipates CEOS support to future GEOGLAM Phases (e.g., Phase 2 and beyond).

Phased approach	2012	2013	2014	2015	2016	2017	2018
1 Foundation activities	[Light blue bar]						
2 New starts			[Light green bar]				
3 Geographic expansions				[Red bar]			
4 Operational							[Black bar]

One of the key activities in Phase 1 is the development of a sampling strategy to trial approaches to mitigate the burden of future global-scale acquisitions. Phase 1 coverage comprises a coverage area of approximately 1.3 million km<sup>2</sup> over 20 countries, covering key wheat, corn, soy, and rice producing areas.



The CEOS SEO worked closely with the GEOGLAM Task Team to develop a series of Target Products, which it then translated into 11 requirements. These requirements were divided by

resolution, and then mapped to data streams – the data streams have been characterized as Primary, Secondary, and Potential.



	Role	Access
Primary	<ul style="list-style-type: none"> <li>Primary Source for Target Products</li> </ul>	<ul style="list-style-type: none"> <li>Optimally free and open</li> <li>Free for R&amp;D (Phase 1-3).</li> <li>Fee-based for operational phase is possible.</li> </ul>
Secondary	<ul style="list-style-type: none"> <li>Secondary Source for Target Products</li> <li>Evaluated in case Core unavailable and for sampling</li> </ul>	<ul style="list-style-type: none"> <li>Optimally free and open</li> <li>Free or small cost for R&amp;D (Phase 1-3).</li> <li>Fee-based for operational phase is possible.</li> </ul>
Potential	<ul style="list-style-type: none"> <li>To be assessed in Phase 2/3</li> <li>Tracked but not utilised in Phase 1</li> </ul>	


Primary	Secondary	Potential
<ul style="list-style-type: none"> <li>&gt; 100m</li> <li>GCOM-W</li> <li>MODIS</li> </ul>	<ul style="list-style-type: none"> <li>&gt; 100m</li> <li>Proba-V</li> <li>S-NPP</li> <li>SMOS</li> <li>SPOT (VEG)</li> </ul>	<ul style="list-style-type: none"> <li>&gt; 100m</li> <li>Sentinel-3 (P2-3)</li> <li>SMAP</li> </ul>
<ul style="list-style-type: none"> <li>10-100m</li> <li>Landsat</li> <li>RADARSAT-2 (P1-3)</li> <li>Sentinel-1</li> </ul>	<ul style="list-style-type: none"> <li>10-100m</li> <li>ResourceSat-2</li> <li>RISAT-1</li> <li>TerraSAR-X</li> </ul>	<ul style="list-style-type: none"> <li>10-100m</li> <li>ALOS-2</li> <li>CBERS-3</li> <li>Sentinel-2 (P2-3)</li> </ul>
<ul style="list-style-type: none"> <li>5-10m</li> <li>RapidEye</li> </ul>	<ul style="list-style-type: none"> <li>5-10m</li> <li>SPOT (HRG)</li> </ul>	<ul style="list-style-type: none"> <li>&lt; 5m</li> <li>Pleiades</li> </ul>

George noted that the *Strategy* has been iterated with the Primary data supply agencies and they are in support. He noted that CEOS Agencies have also been able to support through existing agency and national initiatives, and this has helped to facilitate the acquisition evaluation data from selected missions. A dialogue has been on going with GFOI to ensure that synergies with the existing GFOI acquisition strategy are realized. He outlined some of the next steps.

- *Ad hoc* Working Group to coordinate implementation of the *Strategy*, and provide an update to SIT-29;
- Provisionally target an update to the *Strategy* for the 28<sup>th</sup> CEOS Plenary updating progress on Phase 1 implementation, and potentially proposing a *Strategy* to address GEOGLAM Phase 2; and
- Confirming continuation of the *CEOS ad hoc Working Group on GEOGLAM* to continue to manage CEOS support and interactions with GEOGLAM.

Luc Brûlé (CSA/CEOS Chair) called for a discussion on the endorsement of the *CEOS Acquisition Strategy for GEOGLAM Phase 1*.

- Chu Ishida (JAXA) expressed JAXA’s support for the *Strategy*, and asked how GFOI and GEOGLAM will be coordinated. George noted that the coordination is currently *ad hoc*, but very pragmatic using a number of the same points of contact across agencies. He also noted that overlap in optical data streams could be complimentary, while overlap in SAR data streams can lead to acquisition mode conflicts, which need to be managed. Chu raised the question of whether SDCG for GFOI might be able to handle coordination of both acquisition activities in the future.
- Klaus Schmidt (DLR) expressed DLR’s support for the *Strategy*, and noted that it is nominating the same DLR point of contact as is currently in place for GFOI (Helmut Staudenrausch).
- Brian Killough (NASA/SEO) noted that seven countries are covered by both GFOI and GEOGLAM, and that the SEO is looking at a data distribution system for GFOI that could support other projects.
- Ivan Petiteville (ESA) noted the broader implications for coordination of other acquisitions, including disasters.
- Stephen Ward (NASA) also noted the potential that SDCG for GFOI might be able to facilitate acquisition coordination of other activities, but suggested that Plenary allow a little

more time for SDCG to get on top of the requirements for GFOI before considering broadening its mandate.

Luc noted that Plenary endorsed the *CEOS Acquisition Strategy for GEOGLAM Phase 1*.

27-17	<b>Coordinate implementation of the CEOS Acquisition Strategy for GEOGLAM Phase 1, provide a progress report on implementation, and recommended a way forward.</b>	<i>Ad hoc Working Group on GEOGLAM</i>	SIT-29
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## 21 Continuation of CEOS *ad hoc* Groups

Kerry Sawyer (NOAA/CEO) presented a summary of the current CEOS *ad hoc* Working Groups and entities that Plenary needs to consider for extension of mandate.

### Current *Ad Hoc* Working Groups.

1. *Ad Hoc* Space Data Coordination Group (SDCG) for the Global Forest Observation Initiative (GFOI) - continued
2. *Ad Hoc* Working Group on GEOGLAM - continued
3. CEOS Carbon Task Force (CTF) – continued through milestone of the adoption of the report (expectation is that will happen at SIT-29)
4. *Ad Hoc* Working Group on Disaster Risk Management (DRM) – subsumed into WGDisasters

### Current *Ad Hoc* Entities (or “teams”)

1. Disaster Study Group – temporary *ad hoc* team whose mandate is complete
2. Supersites Coordination Team (SCT) – subsumed into WGDisasters
3. Land Surface Imaging Study Group – continued, report out at SIT-29
4. CEOS GEO Post-2015 Team – cessation based on discussion at Plenary

Kerry noted that, based on the outcomes of the CSSII, any future groups would now be known as “*Ad Hoc* Teams” (existing groups would retain current names).

A discussion followed.

- Adam Lewis (GA) suggested that if CEOS wants to use the name “*Ad Hoc* Teams”, that the name should be applied to existing groups as well. It was felt that because existing groups have invested significant effort in establishing their identities, they should keep their current names if they choose. It was agreed that current group names would be “grandfathered”.
- Stephen Briggs (ESA) noted that we need an estimated delivery date from the CTF for the Carbon Strategy in order to assess the future of this group. Alain Ratier suggested that the nature of the report’s recommendations also need to be taken into account. Mark Dowell noted that comments are due by 25<sup>th</sup> November, which means it won’t be practical to have the report endorsed in time for the GEO Ministerial. Stephen Briggs noted that the report could only be adopted by a SIT meeting (i.e., SIT-29).
- Mike Freilich (NASA/SIT Chair) noted that his understanding is that Diane Wickland will continue as the NASA co-lead for the CTF at least until the milestone of the report being endorsed by CEOS.
- Luc Brûlé (CSA/CEOS Chair) noted that the report cannot be formally delivered at GEO Ministerial until it has been endorsed by CEOS. Chu Ishida noted that he will discuss the endorsement of the report, and whether/how it might be presented at GEO Ministerial with

Masakatsu Nakajima. Mike suggested that a draft of the report could be presented at the Ministerial, stressing that it is pending formal endorsement at SIT-29. Stephen Briggs agreed, noting that the intention isn't to hold up presentation at GEO – but to respect formal processes whilst being flexible enough to make it useful at Ministerial.

- It was agreed that the CTF should be continued until the milestone of the endorsement of the *CEOS Carbon Strategy*, likely at SIT-29. And that a decision on the implementation of the *Strategy* will be discussed at SIT-29.
- Mike noted that he doesn't believe the definition of new Supersites should be delegated to WGDisasters, given the volume of data required. He suggested this could be accommodated through discussion at SIT-29.
- Klaus Schmidt (DLR) agreed that the supersites team has shown great responsibility in not expanding the number of sites too quickly. It is also important to demonstrate that agencies are aware of the scale of the commitments involved.
- Ivan noted that there is an analogue between adding new countries for GFOI and GEOGLAM, and adding new Supersites.
- Mike noted that the consensus seemed to be that the decision should not be taken at the Working Group level, and that new Supersites could be formalised by either the SIT or Plenary. He noted he's leaning towards the SIT due to its enduring nature, but suggested the WGDisasters come back with a proposal for how to approve new Supersites at SIT-29.
- Ivan noted that he thought Julio was going to transition out of the leadership of the LSSG, but Kerry noted she has confirmed he will stay on until SIT-29.
- Brent Smith (NOAA) noted that the work of the GEO Ministerial Working Group and the Post-2015 GEO Working Group goes on, and that CEOS should maintain its involvement. Stephen Briggs suggested that the CEOS GEO Post-2015 Team should continue until delivering its inputs to GEO on the 15<sup>th</sup> of November, and representatives on the team should continue to follow these activities – but that the group should terminate. And CEOS should consider the best response to the GEO Ministerial outcomes at SIT-29.

27-18	<b>Make a recommendation on the optimal process within CEOS for approval of new Supersites.</b>	WGDisasters	SIT-29
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## 22 Update from Global Climate Observing System (GCOS)

Adrian Simmons (GCOS) presented an update on the current status of GCOS activities, noting that it is a relatively small program supported by many contributors. He noted that the sponsors of GCOS have set up a Review Board to assess the Programme's mandate and objectives, and the added value it provides to sponsors' members and the EO community. This assessment will take account of developments since the sponsors' MoU on GCOS was agreed in 1998, including the establishment of groups like GEOSS, GFCS, WIGOS, Future Earth, PROVIA, and others, and the evolving requirements and capabilities for observations and products. The final report is due in April 2014.

He also noted that GCOS has started the process for a 2015 report on the progress and status of climate observation.

 <b>New assessment cycle</b>	 <b>Inputs to the new assessments</b>
<p><b>The GCOS programme has started the process for:</b></p> <ul style="list-style-type: none"> <li>• a 2015 report on the progress and status of climate observation</li> <li>• a new "Implementation Plan" in 2016, which should identify:                             <ul style="list-style-type: none"> <li>- continuing and new requirements, including a restatement of the rationale for the list of ECVs and possible amendment of the list</li> <li>- the adequacy of present arrangements for meeting the requirements</li> <li>- the additional actions needed, with indicative costs, performance indicators and potential agents for implementation</li> </ul> </li> <li>• statements of specific requirements for products                             <ul style="list-style-type: none"> <li>- from both <i>in situ</i> networks and the space-based component</li> <li>- and from integration of the data provided by both</li> </ul> </li> </ul> <p>either embedded in the main Plan or as separate supplement(s)</p>	<p><b>Content will be based on various inputs, including from:</b></p> <ul style="list-style-type: none"> <li>• 2011 WCRP Conference and 2013 SPARC Data Workshop</li> <li>• 2013/2014 IPCC Fifth Assessment Report</li> <li>• 2013/2014 national reporting to UNFCCC on systematic observation</li> <li>• 2014 EUMETSAT Climate Symposium</li> <li>• WMO (GFCS, WIGOS), IOC (GOOS) and post-2015 GEO planning</li> <li>• CEOS/CGMS/WMO initiatives (Architecture, Inventory)</li> <li>• other assessments of requirements (GEO, ESA CCI)</li> <li>• assessments by GCOS/WCRP panels</li> <li>• dedicated GCOS workshops</li> <li>• an open review</li> </ul> <p style="text-align: right;"><i>Support of experts from CEOS agencies is welcomed</i></p>

Adrian noted that GCOS welcomes the proposal for a joint CEOS-CGMS Climate Working Group, in part because observing systems are increasingly serving both climate and weather forecasting needs. He noted that particular areas for cooperation include implementation of the architecture for monitoring from space, and the inventory of ECV datasets. He noted that GCOS will advocate for the integration with *in situ* data where appropriate, and work with partners to support both this and dataset assessment.

Adrian also expressed the desire to link GCOS to activities of the WGCV Land Product Validation subgroup, and suggested that CEOS might be interested in the draft GOOS Deep Ocean Observing Strategy. He added that GCOS appreciates the contributions that CEOS Agencies have made to the observation of climate variables, to the generation of data products and to the provision of data services, and the specific support CEOS Agencies have given to the GCOS programme.

Brent Smith (NOAA) noted that CEOS very much appreciates its long-standing relationship with GCOS, and that the attendance of the GCOS Chair (Carolin Richter) at the SIT Workshop, and Adrian at Plenary are important and appreciated.

### 23 Report on the First 3 Years of CEOS WGClimate

Mark Dowell (EC/JRC) presented an overview of the accomplishments of the WGClimate in the first three years of activity, stressing that the work that WGClimate is doing on observations underpins all aspects of the management, adaptation, and mitigation of climate change effects. He summarised the key outcomes from the first three years, as well as since the last Plenary, and discussed some recent issues.

 <b>WGClimate 2012-2013</b>	 <b>Addressing recent issues</b>
<ul style="list-style-type: none"> <li>• <b>WGClimate 3-year outcomes</b> <ul style="list-style-type: none"> <li>• Provision of a structured, comprehensive and accessible view as to what Climate Data Records (CDRs) are currently available,</li> <li>• Creation of the conditions for delivering further CDRs,</li> <li>• Optimization of the planning of future satellite missions and constellations to expand existing and planned CDRs, both in terms of coverage and record length, and to address possible gaps with respect to GCOS requirements.</li> </ul> </li> <li>• <b>Accomplishments since the 2012 Plenary</b> <ul style="list-style-type: none"> <li>• CEOS response to GCOS IP presented to COP-18/SBSTA-37</li> <li>• Climate from Space Week in Geneva in February</li> <li>• Published 'Strategy Towards an architecture for Climate Monitoring from Space' jointly with CGMS</li> <li>• Completed first ECV inventory questionnaire</li> <li>• Coordinated revised Terms of Reference between CEOS and CGMS</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Carbon Task Force Report Recommendations</b> <ul style="list-style-type: none"> <li>- WGClimate are reviewing the report, to provide feedback, by the November 25<sup>th</sup> deadline</li> <li>- We propose to initiate an fixed-term task within WGClimate, to identify where/if the CTF report recommendations could be addressed within CEOS - by September SIT Workshop 2014</li> </ul> </li> <li>• <b>Broadening CEOS' reporting to SBSTA-RSO</b> <ul style="list-style-type: none"> <li>- Based on a request from SBSTA at COP-17 December 2012</li> <li>- Broaden our periodic reporting to RSO sub-committee on all "activities undertaken by space agencies on topics of interest to the Convention" (e.g. to REDD+ and on Carbon)</li> <li>- This should not be seen as requiring additional work...</li> <li>- WGClimate can act as interface by taking advantage (and acknowledging) effort of other existing CEOS "products" i.e. CTF Strategy report, relevant strategy documents from GFOI</li> </ul> </li> </ul>

Mark noted that WGClimate planned to comment on the *CEOS Carbon Strategy* by 25<sup>th</sup> November, and that WGClimate will initiate a discussion on where the *Strategy* recommendations could be addressed within CEOS. Chu Ishida noted that the CTF would welcome this input and support. He also noted SBSTA-RSO’s request to broaden CEOS reporting to include other activities undertaken by space agencies on topics of interest to the Convention (e.g., support to REDD+, carbon cycle observations).

Mark reviewed the WGClimate approach to climate modelling, including the logical climate architecture, traceable to GCOS Guidelines and Monitoring Principles, and to the ECV Inventory. He noted that the ECV Inventory currently contains about 220 entries; that it will remain continuously open for new submissions; and that periodic snapshots will be taken for analysis and interpretation. He summarised coordination with CEOS Virtual Constellations, and CGMS International Working Groups and SCOPE-CM regarding ECVs, and provided an update on the progress towards the climate architecture road map.



27<sup>th</sup> CEOS Plenary  
Montreal, Canada  
5-6 November, 2013

WGClimate

Additional Achievements by the end of 2013 (1/2)





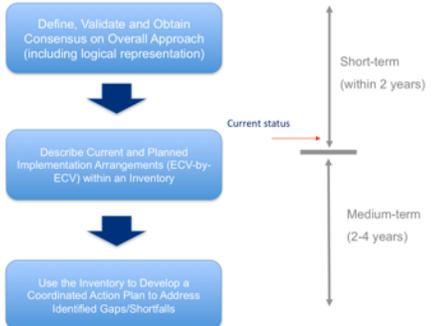
27<sup>th</sup> CEOS Plenary  
Montreal, Canada  
5-6 November, 2013

Architecture Road Map



- Coordination with **CEOS Virtual Constellations & CGMS International Working Groups & SCOPE-CM** regarding ECVs

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; and 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 flowchart shows a three-step process: 1. Define, Validate and Obtain Consensus on Overall Approach (including logical representation); 2. Describe Current and Planned Implementation Arrangements (ECV-by-ECV) within an inventory; 3. Use the Inventory to Develop a Coordinated Action Plan to Address Identified Gaps/Shortfalls. A vertical timeline on the right indicates 'Short-term (within 2 years)' for the first step and 'Medium-term (2-4 years)' for the second and third steps. A red arrow labeled 'Current status' points to the second step.

Mark noted that CEOS WGClimate started a vice chair selection process in March 2013, and a sole nomination was received (Pascal Lecomte, ESA) which was confirmed by his Agency Principal. CGMS Plenary was notified of this on-going leadership selection process, and accepted that this would be an acceptable transition arrangement for the proposed Joint Working Group on Climate. From Plenary, John Bates (NOAA) will assume Chair and Pascal Lecomte (ESA) will assume Vice Chair roles.

Wenjian Zhang (WMO/Space) noted that WMO strongly supports the joint Climate Working Group due to the complexity of the application, and because of the importance of integration in the development of support.

## 24 Proposal for a joint CEOS-CGMS climate working group

Mark Dowell (EC/JRC) presented the details of the decision Plenary is being asked to take on the creation of a joint CEOS-CGMS Working Group on Climate.



- Issue – Decision to adopt, unamended, the revised Terms of Reference for a Joint CEOS-CGMS WGClimate and the proposed transition arrangement
- Options
  - Adopt revised Terms of Reference for a Joint CEOS-CGMS WGClimate (minor changes can be accomplished by the joint WGClimate if needed)
  - Amend revised Terms of Reference for a Joint CEOS-CGMS WGClimate and return them to CGMS for consideration
- Revised ToR have been adopted by CGMS Plenary and CEOS SEC – EUMETSAT to comment
- Thanks to SEC members, CGMS members and particularly EUMETSAT for their help on this issue

The over-arching goal of the CEOS/CGMS Working Group on Climate (WG Climate) will be to improve the systematic availability of Climate Data Records through the coordinated implementation, and further development of the architecture for climate monitoring from space.

More specifically, the coordination shall be designed to achieve three main objectives:

- Provision of a structured, comprehensive and accessible view as to what Climate Data Records are currently available from satellite missions of CEOS and CGMS members or their combination;
- Creation of the conditions for delivering further Climate Data Records, including multi-mission Climate Date Records, through best use of available data to fulfil GCOS requirements (e.g. by identifying and targeting cross-calibration or re-processing gaps/shortfalls );
- Optimisation of the planning of future satellite missions and constellations to expand existing and planned Climate Data Records, both in terms of coverage and record length, and to address possible gaps with respect to GCOS requirements.

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Mark noted that the Terms of Reference (ToR) for the new joint Group only vary slightly from the original WGClimate ToR. He noted the three options being proposed to Plenary.

Paul Counet (EUMETSAT) noted that the CGMS Plenary (CGMS-41) had been very supportive in endorsing the ToR, with reporting to both CEOS and CGMS Plenaries and that a Work Plan for the Joint Working Group is being considered.

Luc Brûlé (CSA/CEOS Chair) noted that there is strong support for the proposal by Plenary, and that based on that the ToR for the joint CEOS-CGMS Working Group on Climate is adopted.

Mark thanked Plenary and the CEOS community for the support throughout this process, and noted that this was an appropriate conclusion of these first three years of WGClimate. He noted that over the next few years, we will see even more increased output based on joint efforts.

27-19	<b>Confirm to CGMS the establishment of the CEOS-CGMS Joint Working Group on Climate and the adoption of the proposed Terms of Reference to CGMS.</b>	<b>CEOS Chair</b>	<b>December 2013</b>
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## 25 WGISS Report and Actions

Satoko Miura (JAXA) provided a report on WGISS activities, reviewing the status of the OpenSearch activity in response to SIT action SIT-28-18.



The objective of OpenSearch is to establish a common CEOS interoperability, standardizing and harmonizing access to metadata and data of CEOS member agencies, including CWIC and FedEO communities.

Satoko raised the issue of whether there is an appropriate place to publish key Working Group results for all of CEOS. Kerry Sawyer noted that this question may be addressed in the CEOS documentation process.

Satoko also raised the issue of IDN Dataset Maintenance, noting that an automated report (email) is sent on a periodic basis, starting with the first report sent to the metadata author and CEOS WGISS agency contact on 17<sup>th</sup> September 2013. She requested that each CEOS Member Agency, especially those without active WGISS participation, review the automated report and take required actions in a timely manner.

Ivan Petiteville noted that the accuracy of the information in sources like the IDN is critical, and it is essential that agencies check that their information is complete and up to date, similar to the annual update of the MIM database.

Finally, Satoko noted that she is passing the WGISS Chair role to Richard Moreno of CNES, and Andrew Mitchell of NASA will now be in the Vice Chair role. She thanked Plenary, and the CEOS community, for their support during her Chair term. Luc Brûlé thanked Satoko for her leadership, and Richard and Andrew for stepping forward.

27-20	<b>Review automated IDN dataset reports and follow-up to address any issues identified.</b>	<b>CEOS Agencies</b>	<b>COMPLETE</b>
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## 26 WGCV Report and Actions

Satish Srivastava (CSA) presented an update on WGCV activities, providing an update on the status of open Plenary and GEO actions.

**Action 26-11:** GEO Water Cycle Strategy Report: Draft section on Cal/Val for this report was written by Dr. Eric Wood (Princeton U.) and it was provided to Osamu Ochiai and others.

**Action 26-24:** WGCV Subgroup Leadership Roles to be Staffed: At SEC-172 WGCV agreed to work internally on staffing and it was successful.

**GEO Actions:** IN-02-C1\_3 (QA4EO), and IN-02-C1\_5 (Enabling Data and Information Interoperability and Harmonization in CEOS and GEO) – progress has been made and reported in CEOS-GEO Action Tracking System.

Satish noted that the WGCV-36 Plenary was held in Shanghai, May 2013, and there was engagement by SST-VC, AC-VC, LSI-VC, and PC-VC. He thanked UKSA and NPL CCM for providing the QA4EO secretariat including the maintenance of the QA4EO website. He noted that an assessment of lessons learnt and extending to showcase is planned for February 2014 as a part of the way forward for QA4EO. He provided an update on LandNET, a network of automated instrumented bright surface reflectance targets, noting that the first step is to initiate a pilot project consisting of three or four sites based on existing agencies experience (i.e., ESA, CAS, CNES, NASA, NPL). He invited other CEOS agencies to engage in LandNET. Satish also informed that EC-JRC is inviting CEOS agencies to indicate their interest in an inter-comparison exercise of ECV retrieval algorithms over land (following QA4EO principles).

Satish reviewed the details of a request for decision that WGCV is seeking from Plenary on multi-agency Cal/Val campaigns.

**Project 1: SST Comparison Campaign Proposal**

Cal/Val sensor comparison campaign in support of SST and LST measurements from space (support action for VC-SST and WGC) (follows similar highly successful Tuz Golu campaign for surface reflectance and Miami 3 (2009) for SST (10 global participants) using QA4EO guidelines)

**Proposal**

4<sup>th</sup> of ~5 yearly ('Miami' 1,2,3) WGCV comparisons for radiometers including black bodies

- Phase 1 (2014): Laboratory based vs. SI traceable standards (radiometers and black bodies) (Land and Ocean applications)
- Phase 2A (2014 – 2017): Series of ship/ocean based radiometer campaigns
- Phase 2B (2015 – 2017): Field-based calibration of radiometers
- Participation open to all

**Background**

- Essential Climate Variables Sea Surface Temperature (SST) and Land Surface Temperature (LST) are both dependent on global satellite observations of surface emitted thermal radiation
  - Heritage long-time series of data from multiple sensors exists
  - New sensors soon to be launched e.g. Sentinel 3, JPSS-1
- International comparisons are essential to provide confidence in data, test innovation and facilitate capacity building and training

**Project 1: SST Comparison Campaign Proposal (continued)**

- ESA have offered to provide funding to support the organisation, logistics and analysis of the comparison (initially for Phase 1 and 2A)

**Subject to:**

- CEOS member agencies indicating their willingness to support the participation (travel/subsistence ~2 wks to UK) and instruments transport of appropriate Cal/Val teams from their region of influence.
- For Phase 2A, this will require radiometers to be deployed on ships for a few months (no cost for ship but for radiometer transport).

**For Phase 2B resource exists for planning of calibration campaign (CEOS WGCV- IVOS and LPV)**

- CEOS member agency (ies) sought to provide resource to host one or more field sites based comparisons

**Benefits to CEOS agencies:**

- Knowledge to remove and correct instrument biases enabling harmonised global satellite Cal/Val
- Potential to learn and improve from peer interactions

**Project 2: SST (pilot) 'Operational Validation Project' Proposal**

**Background:**

- For SST validation (Operational and Climate) require network of high performance drifting Ocean Buoys for continuous monitoring of Ocean Temps, in addition to Ship borne radiometers analogous to 'test-sites' such as Aeronet and new LandNET
  - Key part of strategy to bridge 'data gaps' between sensors for climate
  - White paper drafted by VC-SST, GHRSS, WGCV-IVOS detailing background available
  - Existing networks not sufficient in number for necessary coverage

**Request to agencies**

- Agency (or group of) to provide resources to launch a set of high performance well-calibrated SI traceable drifting Ocean Buoys as an initial demonstration pilot project. Buoys can be built nationally to meet community defined specification
- Agencies to allocate resources to continue and where possible extend number of ocean borne radiometer cruises for SST validation - independent of specific satellite missions to facilitate improved management of 'data gaps' between missions for Climate.

**Decision Requested from Plenary**

- WGCV requests following decisions from CEOS Plenary**
  - Approval to proceed with Phase 1 and 2A for Project 1: SST Comparison Campaign. A detailed plan for Phase 2B will be developed and presented at SIT-29 in April, 2014
  - Approval to proceed with detailed planning of Project 2: SST (pilot) Operational Validation Project that will be presented at SIT 29 in April, 2014

Luc Brûlé (CSA/CEOS Chair) noted that Project 1, Phase 1 and Phase 2A have resources allocated from ESA, and no objections were raised at Plenary – so it is endorsed. He noted that for Phase 2B of Project 1, relating to SST Comparison Campaign and Project 2, relating to the SST-VC (pilot) Operational Validation, there were no objections to proceeding with detailed planning to be presented at SIT-29.

Satish thanked Kerry Sawyer and Luc for their guidance, and ensuring follow-up from the SIT Technical Workshop.

27-21	<b>Develop and recommend detailed plans for the way forward on the SST Comparison Campaign and SST Operational Validation Project.</b>	<b>WGCV</b>	<b>mid-March 2014</b>
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## 27 WGCapD Report and Actions

Hilcéa Ferreira (INPE) presented a summary of WGCapD activities, reviewing the main 2013 accomplishments.

- 2<sup>nd</sup> meeting of WGCapD was held in Frascati, Italy, from March 4-6, 2013, with 17 participants, and 11 virtual attendees;
- Focused on obtaining access to global DEM on a country-by-country basis;
- Implementation of a remote-sensing E-learning course;
- Practical EO Education for Students and Teachers and an education booth at the ESA Living Planet Symposium;

- First round of questionnaires for the CB Inventory Project (50+ responses received); and
- Support to Capacity Building Activities for the DRM Pilots.

Hilc ea reviewed the way forward for WGCapD and shared with Plenary participants a recently-produced WGCapD promotional video.



- How can we define success? How can we measure the impacts of our trainings/workshops in the countries and communities?
- Inclusion of a Monitoring and Evaluation Component into training initiatives.
- Community building: creating a BLOG or Facebook community.
- Seeking opportunities to **connect workshop and other training initiative participants with existing CEOS and GEO projects**. Train them on the technical side and then give them contacts to start the process in their own country

She noted that the leadership of WGCapD will be transitioning to NOAA (Jacob Sutherlun, incoming Chair), with SANSa (Jane Olwoch) as the incoming Vice Chair. Luc Br ul e thanked Hilc ea for her leadership of WGCapD, and thanked Jacob and Jane for stepping forward.

<b>27-22</b>	<p><b>Provide feedback to WGCapD on its promotional video</b>                  (<a href="http://www.ceos.org/images/WGCapD_Video_2.pptx">http://www.ceos.org/images/WGCapD_Video_2.pptx</a>).</p>	<b>CEOS Agencies</b>	<b>January 2014</b>
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**28 CEOS Systems Engineering Office Report**

Brian Killough (NASA/SEO) reviewed the 2013 Accomplishments of the CEOS Systems Engineering Office (SEO):

- Continued support for the CEOS website and mailing lists, development of outreach materials and videos, COVE testing and data acquisition analyses for GFOI and GEOGLAM, WGCapD training for Africa, GFOI training and capacity building with SilvaCarbon;
- Supported WGClimate (ECV Inventory), MIM Database (with ESA), Disasters (gap analyses), Carbon Task Force (gap analyses);
- Data Acquisition Planning and System Analyses (historical coverage, cloud probabilities, mission combination analyses) for GFOI and GEOGLAM;
- Worked with WGISS to maximize the impact of CWIC, provide an interface with GEO, and manage CWIC development contracts with NASA/NOAA. Completed a Data Policy Study and Portal; and
- Enhanced COVE tool to improve support of GFOI and GEOGLAM. Conversion to Spanish, connections to data archives.

Brian reviewed the major SEO Initiatives for 2014, which include: continued support to GEOGLAM and GFOI; development of a prototype cloud-based data processing and distribution system in support of SDCG and GFOI; development of a coverage analyzer tool; enhancement of the COVE tool; and, outreach support for several major meetings using the newly acquired CEOS Hyperwall (large video wall), including the 2014 GEO Ministerial Meeting and the 2014 IGARSS Conference.

**New Features in COVE**

- Landsat 7 and Landsat 8 Actual Acquisitions. Clicking on any actual scene retrieves the browse image.
- 2D global output in JPEG format.
- Export screen contents to KML for viewing in Google Earth or sending to others.
- Overlays ... GlobCover, MODIS Land Cover Classification (LCC), Cloud Cover (global monthly statistics), Precipitation (global monthly statistics).
- Conversion to Spanish.

**Data Policy Study and Portal**

**107 Current Missions, 292 Mission-Instrument Pairs, from 26 CEOS Agencies**

- Open (no registration) = 47%
- Open (simple registration) = 21%
- Open (advanced approval) = 5%
- Restricted = 22%
- Unknown = 5% (mostly China missions)

**Other Categories (current missions only)**

- DataCORE = 33%
- IDN Portal = 45%
- CWIC = 27%

**Comments**

- 73% of CEOS mission data is OPEN and accessible. This includes all missions since 2000.
- New Data Policy website available at: <http://www.ceos-datapolicy.org/>
- Discussing future plans to link the policy information to the MIM.

**Thanks to WGISS** for their excellent feedback and guidance during the data exploration period and tool development.

Ivan Petiteville noted that the outreach efforts of the SEO are very important, and thanked Brian for his contribution.

### 29 CEOS MIM Database and EO Handbook

Ivan Petiteville (ESA) gave an overview 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. It is updated annually, and is a mature resource with a variety of uses and users.

**2013 Highlights**

Successful survey processes – thank you Contacts

Highly productive coordination with the SEO

- Further enhancement of database contents based on ongoing dialogue (measurement accuracy, etc.)
- Collaboration on future directions

Support to WGClimate – discussion on details of including ECV Inventory information within MIM

Additional measurement parameters to the mission profiles

**Way Forward**

Support to WGClimate and integration of ECV Inventory

Continued and further expansion of work with SEO & strengthened support and interaction with CEOS community

Annual updates – call expected in April-May 2014

Continued enhancement of content and utilities for analysis. Calendar of upgrades defined in multi-year plan agreed by all CEOS entities involved (MIM, SEO, WGClimate, WGISS,...)

Further integration and consistency with key sources

EO Handbook print edition is approx. every 3 years as budget & major events to promote CEOS activities permit

The 27<sup>th</sup> CEOS Plenary - Montreal, Canada - 5-6 November, 2013

Ivan noted that the next call for updates is expected in April-May 2014, and thanked agency contacts for their support.

### 30 Finalising the Montreal Statement

Kerry Sawyer (NOAA/CEO) reviewed the final changes to the Montreal Statement, and it was adopted by Plenary. It is included as an appendix to these minutes.

<b>27-23</b>	<b>Produce a glossy print version of the Montreal Statement for distribution by CEOS at GEO Plenary and Ministerial and in connection with other outreach opportunities.</b>	<b>SEO</b>	<b>December 2013</b>
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### **31 Reports from CEOS Agencies**

A number of agencies provided updates on their missions and activities. Presentations are available on the CEOS Plenary website, with some key points noted below.

#### **Instituto Nacional de Pesquisas Espaciais (INPE) - Hilca Ferreira:**

- Hilca reported that INPE's new director intended to come to Plenary, but wasn't able because of preparations of CBERS-3 launch; and
- She confirmed that Julio will be present in his role in LSSG until SIT-29.

#### **European Space Agency (ESA) – Stephen Briggs:**

- The GOCE mission is now complete, having produced the best geoid ever, < 2cm;
- The Swarm mission is scheduled for launch 21<sup>st</sup> November;
- Biomass (P-band SAR) has been selected as the 7<sup>th</sup> Earth Explorer mission;
- Sentinel-1A is scheduled for launch March-April 2014; and
- The ESA Climate Change Initiative is focused on generating longer term, better calibrated climate data sets.

#### **EUMETSAT - Alain Ratier:**

- EUMETSAT has 30 member states in 2014;
- Cooperation agreements have recently been signed with NASA, NOAA, CMA, ISRO;
- EUMETSAT is preparing a multi-mission product using Jason-3 and Sentinel-3; and
- Meteosat Third Generation has been approved and is under development.

#### **National Satellite Meteorological Center/Chinese Meteorological Administration (NSMC/CMA) – Fan Jinlong:**

- FY-3C was launched in September 2013;
- The FY-2 and FY-3 series are contributing to GEOSS;
- FY-2D/2E was upgraded using GSICS inter-calibration algorithm, significantly improving performance; and
- A number of space data providers supported the a Charter activation related to Chinese Flood monitoring in August 2013. (e.g., FY-3A, TerraSAR-X, RADARSAT-2, SPOT-5, WorldView-1/Quickbird, etc.)

#### **Netherlands Space Office (NSO) - Joost Carpay:**

- NSO is looking for flight opportunities for miniaturised instruments (i.e., Hyperspectral, spectrometers, TIR imagers, laser altimeters, etc.).

#### **National Oceanic and Atmospheric Administration (NOAA) – Mary Kicza:**

- 15 satellites currently being operated out of NOAA operations center; and
- NOAA is a long time contributor to CEOS, and this will continue as the next round of CEOS leadership takes over. CEOS is a key partnership for NOAA.

#### **Japan Aerospace Exploration Agency (JAXA) – Chu Ishida:**

- Japan's new Basic Space Plan features remote sensing as one of four key social infrastructure elements;
- The GPM Core and ALOS-2 will be launched in 2014;
- JAXA will be 2015 CEOS Chair, and its priority areas will include disasters, oceans, and EO applications;
- APRSAF-20 to be held 3<sup>rd</sup>-6<sup>th</sup> December 2013 in Hanoi in cooperation with VAST; and

- JAXA would like explore connections between APRSAF and CEOS.

**Indian Space Research Organisation (ISRO) – Rajeev Jaiswal:**

- ISRO is celebrating 25 years of operational remote sensing this year; and
- Since last Plenary SARAL (February 2013) and INSAT-3D (July 2013) have launched.

**32 SIT Accomplishments from 2012-2013 and Handover to CNES**

Mike Freilich (NASA/SIT Chair) thanked CSA for chairing and hosting an outstanding Plenary. He thanked and recognised the NASA SIT Chair Team for their efforts. He noted that the SIT Chair Team benefitted greatly from the support of the CEOS CEO, Kerry Sawyer, and the CEOS SEO, Brian Killough – the accomplishments of the NASA team would not have been possible without them. Mike remarked that the CEO and SEO are an excellent resource, and encouraged CEOS Agencies to work closely with them.

Referring to the end of NASA’s term as CEOS SIT Chair, Mike noted that the agency will continue its commitment to and participation in CEOS – including through individuals working at all levels across the organisation. He reflected on a few accomplishments of the SIT Chair team, including the development of the CSS documents, and a fuller integration of the VC and WG issues and concerns with CEOS leadership, including the Secretariat, through regularly scheduled telecons and communications with the SIT Chair.

Mike welcomed Pascale Ultré-Guérard and the incoming CNES SIT Chair Team to the SIT Chair role.

**33 CNES Vision and Approach for SIT 2014-2015**

Pascale Ultré-Guérard (CNES/SIT Vice Chair) presented a summary of the CNES SIT Chair Team vision and approach. She noted two main objectives for their term: managing change (i.e., implementation of CSSII recommendations); and, delivering on CEOS core business (e.g., support to GEO) including improving access for the users to the CEOS agencies data based on VC’s and WG’s support. She noted that the CSSII process has clarified many aspects of CEOS operations.

She reviewed the membership of the CNES SIT Chair Team.

27 <sup>th</sup> CEOS Plenary Montreal, Canada 5-6 November, 2013		27 <sup>th</sup> CEOS Plenary Montreal, Canada 5-6 November, 2013	
CNES SIT Chair team		CNES SIT Chair team	
<b>SIT</b>	Pascale Ultré-Guérard (chair) Steven Hosford	ACVC, CTF GEOGLAM Health PoC	Carole Deniel Gérard Dedieu Cécile Vignolles
<b>WGISS</b>	Richard Moreno (chair) Jérôme Gaspéri	External: VC interface	Jean-Louis Fellous
<b>CEOS support</b>	Mireille Paulin Danielle Barrère (meetings/logistics)	Meetings/general support	Stephen Ward and George Dyke
<b>WGCalVal</b>	Patrice Henry	and last but not least, we would like to have a <b>SIT Vice-Chair (TBF)</b>	
<b>WG Climat, PVC</b>	Philippe Veyre		
<b>OSTVC, OCRVC</b>	Juliette Lambin (OST co-chair)		

Pascale noted that she looks forward to working with CEOS Chairs EUMETSAT and JAXA in the next two years. She also noted that the SIT Vice Chair role remains to be filled, and encouraged agencies to submit nominations.

SIT-29 will take place 8<sup>th</sup>-10<sup>th</sup> April 2014 in Toulouse at CNES Toulouse Space Centre, and registration will be required by the end of January in order to ensure access to the Space Centre.

### 34 EUMETSAT Priorities and Outcomes for 2014

Alain Ratier (EUMETSAT) presented a summary of EUMETSAT’s proposed outcomes for its CEOS Chair term.

- Governance improvements per post-CSS arrangements, and the preparation of the first CEOS three-year Work Plan;
- Support and promotion of the two new working groups, and their foundation activities;
- Supporting the identification of a DCEO and a transition with the end of Kerry Sawyer’s term in December 2014; and
- The Climate Research and Earth Observations from Space symposium will take place 13<sup>th</sup>-17<sup>th</sup> October 2014 in Darmstadt, and registration will open 1<sup>st</sup> December.

Alain reviewed the priorities for the EUMETSAT team, as well as the Chair team membership.



**Slide 7: Priorities of EUMETSAT CEOS Chairmanship**

- ❖ Seek commitments from CEOS members to support key CEOS positions
  - Commitment of resources needed to ensure that CEOS can continue to deliver in line with its mission and goals
  - Key positions need to be filled at the end of 2014, requiring decisions in the very near future
  - This includes both the CEO and D/CEO positions, as well as identification of the next CEOS SIT Chair

Slide 7 EUMETSAT Chair priorities, CEOS Plenary, November 2013, Montreal, Canada

**Slide 8: EUMETSAT CEOS Chair Team**

 Alain Ratier CEOS Principal/Chair	 Anne Taube Support to organisation of CEOS Plenary 2014
 Paul Counet CEOS Chair Team Lead	 Rowanna Comerford Support to CEOS SEC
 Robert Husband CEOS Chair Team	 Hans Bonekamp OST VC Chair
 Mark Churchyard CEOS Chair Team	 Julia Figa OSVW Chair
	 Sylvia Mieczurska Support to CEOS SEC

Slide 8 EUMETSAT Chair priorities, CEOS Plenary, November 2013, Montreal, Canada

He noted that the 28<sup>th</sup> CEOS Plenary will take place 28<sup>th</sup>-30<sup>th</sup> October 2014 at the Rica Ishavshotel in Tromso, Norway. Per-Erik Skrovseth (NSC) gave background info on Tromso.

### 35 Future CEOS and SIT Chairmanships

Luc Brûlé (CSA/CEOS Chair) reviewed the status of CEOS leadership, and thanked Kerry Sawyer, Marie-Josée Bourassa, Brian Killough, and others in the community for their support to the CSA Chair team. He wished the EUMETSAT team all the best for their CEOS Chair term.

	<i>CEOS Chair</i>	<i>SIT Chair</i>
2014	<b>EUMETSAT</b>	<b>CNES</b>
2015	<b>JAXA</b>	<b>CNES</b>
2016	<b>Australia</b>	<b>?</b>

Thanks to all the agencies and the enlarged CEOS leadership team who have contributed to the preparation of this 27<sup>th</sup> Plenary, and the productive discussions we just had over the past two days.

**Thank you all!**

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## List of Participants

Organization	Participant	Organization	Participant
ASI	Stefano Bruzzi	JAXA	Shizuo Yamamoto
ASI	Simonetta Zoffoli	JAXA	Chu Ishida
CONAE	Conrado Varotto	JAXA	Satoko Miura
CONAE	Anna Médico	JAXA	Yukio Haruyama
CNES	Pascale Ultré-Guéraud	NASRDA	Kayode Odimayomi
CNES	Steven Hosford	NSC	Per-Erik Skrovseth
CNES	Richard Moreno	NSC	Einar-Arne Herland
CSA	Luc Brûlé	NSC	Ann-Lisbeth Ruud
CSA	Marie-Josée Bourassa	NSMC/CMA	Caiying Wei
CSA	Yves Crevier	NSMC/CMA	Jiashen Zhang
CSA	Satish Srivastava	NSMC/CMA	Lei Yang
CSA	Christine Giguère	NSMC/CMA	Jinlong Fan
CSA	George Dyke	NASA	Mike Freilich
CSIRO	Alex Held	NASA	Christine Bogнар
CSIRO	Arnold Dekker	NASA (SEO)	Brian Killough
DLR	Klaus Schmidt	NASA (SEO)	Kim Keith
DLR	Martin Wegmann	NASA	Lena Braatz
DLR	Jörn Hoffman (GTM)	NASA	Yonsook Enloe
EC	Reinhard Schulte-Braucks	NASA	Andy Mitchell
EC/JRC	Mark Dowell	NASA	Guy Seguin
Env. Canada	Godelieve Deblonde (GTM)	NASA	Patricia Jacobberger-Jellison
ESA	Stephen Briggs	NASA/ESA/JAXA	Stephen Ward
ESA	Ivan Petiteville	NASA	Karen Moe (GTM)
ESA	Pascal Lecomte	NOAA	Mary Kicza
EUMETSAT	Alain Ratier	NOAA	Brent Smith
EUMETSAT	Paul Counet	NOAA (CEO)	Kerry Sawyer
EUMETSAT	Robert Husband	NOAA	Jacob Sutherlun
EUMETSAT	Mark Churchyard	NOAA	John Bates
EUMETSAT	Anne Taube	NSO	Joost Carpay
GA	Adam Lewis	SANSA	Sandile Malinga
GCOS	Adrian Simmons	SANSA	Jane Olwoch
GEO/Disasters	Francesco Gaetani (GTM)	SANSA	Asanda Ntisana
GEO/GEOGLAM	Michel Deshayes	UKSA	Ruth Boumphrey
GEO/GFOI	Simon Eggelston (GTM)	US Dept. State	Robert Ford
INPE	Hilcéa Ferreira	USGS	Tom Cecere
IOCCG	Venetia Stuart	VAST	Tuan Pham
IOCCG	David Antoine	WMO/Space	Wenjian Zhang
ISRO	Rajeev Jaiswal		

(GTM) indicates remote participation via GoToMeeting.

## Montreal Statement 6 November 2013

We, the assembled participants of the 27<sup>th</sup> Plenary meeting of the Committee on Earth Observation Satellites (CEOS), taking place in Montreal, Canada, on 5 and 6 November 2013:

**Building** upon our collective commitments to coordinate our Earth observation satellite missions in response to needs expressed by the United Nations Framework Convention on Climate Change (UNFCCC), the UN Office for Disaster Risk Reduction International Strategy for Disaster Reduction (UNISDR), UN Conventions on Biodiversity and Desertification, the intergovernmental Group on Earth Observations (GEO), the Global Climate Observing System (GCOS), World Meteorological Organization (WMO) Programmes, the Group of 20 Industrialised Nations (G20), the Food and Agriculture Organization (FAO), and other external stakeholders;

**Confirming** our Primary Mission to ensure international coordination of civil space-based Earth observations programs and promote exchange of data to optimize societal benefit and inform decision making for securing a prosperous and sustainable future for humankind; and,

**Recognizing** the major investments made by CEOS Agencies in developing the space-based segment of the Global Earth Observation System of Systems, and global observing systems operated under the auspices of the United Nations;

**Declare that:** With the renewal and strengthening of the organization governance, CEOS Agencies have agreed to continue and enhance their cooperation to respond effectively to Earth Observation users' needs. We will do so by achieving integration across the full range of Earth observations, by closing important observational gaps, and by promoting the sharing, and improving access to and use of, CEOS Agency data. This cooperation will be expressed through global-level initiatives and projects, including:

- In a joint effort with the Coordination Group for Meteorological Satellites (CGMS), development and provision of climate data records, in support of climate monitoring, research, and services;
- Coordinated space-based observations to support the effective monitoring and management of the world's forested regions to support any future international climate agreement, including Reducing Emissions from Deforestation and forest Degradation, sustainable forest management, conservation and carbon enhancement (REDD+);
- Implementation of the 1<sup>st</sup> phase of the acquisition strategy for supporting the monitoring of agricultural production at national, regional and global levels which is complementary to the Agricultural Market Information System (AMIS) initiative;
- Implementation of a strategy for observing and assessing the global carbon cycle;
- Application of space-based Earth observations to support research in biodiversity, the world's oceans, and an improved understanding of the global water cycle; and
- Strengthened support to the disaster management community through both the creation of a new CEOS Working Group on Disasters and the development of a global observation strategy.

CEOS will accomplish these activities through contributions from its Virtual Constellations and Working Groups, among other mechanisms. CEOS will continue to address user needs, for data quality, data discovery and access, and capacity building.

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