

# MINUTES OF THE 2017 CEOS SIT TECHNICAL WORKSHOP

13<sup>th</sup>-14<sup>th</sup> September 2017  
ESA/ESRIN, Frascati, Italy

## Main SIT Technical Workshop Discussion Points, Outcomes and Actions

### Data and Architectures

1. The five main **FDA** themes to be proposed for Plenary consideration were reviewed for information ahead of a Plenary decision.
2. 2017 progress on the **MRI framework** was reviewed, and there was a discussion around potential synergies with FDA and CARD4L.
3. The draft **CARD4L** Product Family Specifications developed were reviewed, and the process towards implementation was outlined.

### Support to GEO and Partner Initiatives

4. The outcomes of the VC/WG day discussion on **CEOS Water coordination** were reviewed, including a proposal for a 'Water from Space' coordination workshop to be held in 2018.
5. Plans for **SDCG** in the context of **GFOI Phase 2** were reviewed, and it was agreed that a commitment from CEOS to support Phase 2 is required to capitalise on Phase 1 investment.
6. The outcomes of the **trial LSI-VC / SDCG / GEOGLAM joint meetings** were reviewed, including a recommendation to hold another joint meeting in 2018.
7. The **SDG ad hoc Team** work since Brisbane Plenary was reviewed, and the Team will seek another year's mandate to progress an implementation plan, compendium of CEOS engagement, and engage with GEO via a GEO Plenary side meeting.
8. It was agreed that CEOS should **help make the case for support to International Financing Institutions (IFI)** by preparing a one-page statement on EO for Overseas Development Aid (ODA) for Plenary, and a supporting document of examples.

### Carbon and Climate

9. Plans for the **incoming 2018 CEOS Chair's activities focusing on carbon and climate** were discussed, and several linkages to other CEOS activities were identified.
10. The status of **CEOS Carbon Strategy implementation** was reviewed, with some progress in each of the work areas reported.
11. Coordination of CEOS inputs to the **update of IPCC Guidelines for national GHG inventories** were discussed, noting that the timeframe for CEOS inputs remains tight.
12. The substantial progress on **ECV Inventory implementation** was reviewed, with the public release of the Inventory expected in October 2017.
13. Progress on the **Space Agency response to the updated GCOS IP** was reviewed, and the process for final review was agreed.

### CEOS Organisation and Leadership

14. **AC-VC** raised the issues of **data access, AQ measurement goals, joint AQ/GHG** for attention.
15. **SST-VC** raised the issue of **passive microwave observation continuity** for attention.
16. The call for nominations for the **WGISS Vice Chair** position remains open. Agencies are encouraged to present a candidate for endorsement at Plenary.
17. Continuity of the **OST-VC leadership** is being addressed and should be followed-up at SIT-33.
18. The call for nominations for the **WGCapD Vice Chair** position remains open, with agencies encouraged to present a candidate for endorsement at Plenary.

## 1. Welcome and Opening Remarks

Josef Aschbacher (ESA, Director of EO) welcomed all participants to ESA ESRIN. Josef recalled his heritage with CEOS, including for the World Summit on Sustainable Development (WSSD) in 2002, and expressed his strong support for the objectives and activities of the organisation. ESA is fully committed to contributing to CEOS, and believes that international collaboration is key to realising the full potential of EO. Josef thanked Stephen Briggs for his expert leadership of the SIT these past two years.

Stephen Briggs (SIT Chair/ESA) added his welcome to all participants attending the 2017 SIT Technical Workshop in person and via web-conferencing. He summarised the meeting objectives as proposed, and the overall structure and agenda for the Workshop.

1. Advancement of the CEOS Virtual Constellations (VCs) and Working Groups (WGs)
  - a. Consult with VCs and WGs, including a dedicated day (Tuesday 12<sup>th</sup>), and identify areas for coordination and cooperation within and between the groups.
  - b. Identify key issues for the VCs and WGs that require coordination prior to discussion and decision as an input to CEOS Plenary.
2. Revisit progress against the 2016-2017 CEOS SIT Chair term priorities, including:
  - a. Ensuring the successful advancement of ongoing CEOS commitments and deliverables, identifying and addressing issues and obstacles impacting each priority initiative;
  - b. Ensuring full access to, and exploitation of Copernicus Sentinel data;
  - c. Further developing, with the joint CEOS-CGMS WGClimate and through GCOS, the relationships with IPCC and UNFCCC required to support observation of climate indicators in support of the Paris Agreement;
  - d. Maintaining and improving effectiveness of our strategic partnerships, including with UN agencies, Development Banks, international programmes and agencies; the effective functioning of GEO, and CEOS within it, is a high priority in this; and,
  - e. Supporting the initiatives proposed by the CEOS Chairs in 2016 and 2017.
3. Review the proposed way forward recommended by the Future Data Architectures *ad hoc* Team (AHT), and provide guidance to the Co-Chairs.
4. Review the discussion from the first trial joint meeting between LSI-VC, SDCG, and the GEOGLAM *ad hoc* Working Group.
5. Review and discuss a proposed way forward (incl. possible Plenary decision) on CEOS agency coordination in engaging the International Finance Institutions (IFIs).
6. Review progress and status across key thematic areas of the Expected Outcomes, and items due for decision or action at Plenary:
  - a. Climate Monitoring, Research, and Services (incl. WGClimate,)
  - b. Carbon Observations (incl. CO<sub>2</sub>/GHG observations, GFOI and SDCG, Carbon Strategy)
  - c. Observations for Agriculture (incl. GEOGLAM)
  - d. Observations for Disasters (incl. WGDisasters, GEODARMA)
  - e. Observations for Water (incl. COVERAGE, Blue Planet, GEOGLOWS)
  - f. Capacity Building, Data Access, Availability and Quality (incl. WGCapD, WGISS, WGCV)

7. Support to Other Key Stakeholder Initiatives and Outreach to Key Stakeholders.
  - a. GEO-XIV Plenary
  - b. Reporting to COP-23
  - c. UN Sustainable Development Goals (SDG) process (incl. SDG AHT)
8. Discussion of CEOS organisational matters for coordination prior to the 2017 CEOS Plenary.
9. Identification of main discussion points, items for decision/disposition, and anticipated outcomes of Plenary.

## 2. Incoming CEOS Chair Themes for 2018

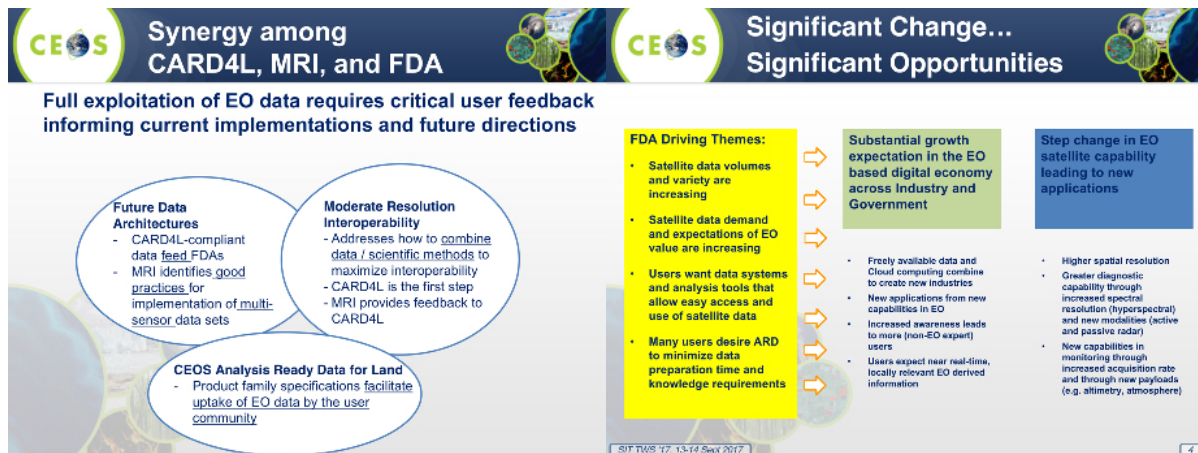
Mauro Facchini (COM) presented a summary of the CEOS Chair priorities for 2018:

- ensuring continuity and coherence of CEOS activities;
- progression of FDA, SDGs, Moderation Resolution Sensor Interoperability, future partnerships, existing thematic acquisition strategies;
- the successful advancement of ongoing CEOS commitments;
- ensuring Copernicus Sentinel data access and uptake;
- rationalisation of some on-going activities and structures;
- the two main priority activities are: laying foundations for a GHG emission monitoring system; bring the benefits of FDA to the present and identify new targets; COM wish to promote the contribution of DIAS; to support the exploitation of ARD; to promote the CEOS Data Cube; and to expand work on the user classification and user needs inventory; and,
- a number of dedicated workshops are foreseen: DIAS; prioritisation of user needs; carbon observations; expanding uptake of SAR data.

The Incoming Chair team will circulate a paper ahead of CEOS Plenary on their plans for their 2018 chairmanship term. Steve Volz (NOAA/SIT Vice Chair) noted the reference to Generation 2020 and would welcome discussion of that in due course. It was suggested that WGISS consider following up on these discussions.

## 3. Future Data Architectures (FDA) Objectives and Implementation Planning

Steve Labahn (USGS/FDA AHT Co-Lead) presented a summary of the status and outcomes of the FDA process, including the potential synergies and inter-relation amongst CARD4L, MRI, and FDA. He also reviewed opportunities that may arise as the changes related to FDA unfold.



Steve referred to the draft strategy document being developed for endorsement at CEOS Plenary. This focuses on five themes:

- Analysis Ready Data;
- Interoperable Open Source Tools;
- Data, Processing and Architecture Interface Standards;
- Analytical Processing Capabilities; and,
- Data User Metrics.

The CEOS SEO is involved in several Data Cube related tool pilot activities. There was some discussion on the expectation that the last three topics on the list be resourced through WGISS. It was also noted that WGISS resources to continue advancing these efforts remain to be confirmed. The FDA *ad hoc* Team will ask Plenary to continue its activities in 2018, centred around these five themes, with LSI-VC, SEO, WGISS, and WGCapD all having roles to play.

Steve Volz (NOAA/SIT Vice Chair) stressed the need to be specific on the nature of the users FDA seeks to support, including the less sophisticated users.

There was a short discussion on the future organisational arrangements for the FDA work items and the need for resources and coherence across the CEOS groups involved. This point should be addressed in the Plenary decisions, and reflected in any decisions taken.

#### 4. Moderate Resolution Interoperability (MRI) Initiative

Eugene (Gene) Fosnight (USGS) reported on the latest progress of the CEOS MRI initiative:

- the initiative addresses the CEOS strategic objective to encourage complementarity and comparability among the increasing number of Earth observing systems in the moderate resolution class for both optical and SAR sensors and the data received from them;
- 2017 accomplishments include: a framework paper for moderate (10-100m) resolution interoperability describes data characteristics important for densifying and extending time series using multi-sensor data streams; the Harmonized Landsat Sentinel-2 (HLS) case study identifies and summarizes lessons learned through the production of an interoperable data product; the Vegetation dynamics monitoring with HLS data will explore the relationship between spatial

- resolution, temporal resolution and vegetation type; the MRI Survey gathers lessons learned and good practices of multi-sensor interoperability from the user community; and,
- next steps include: feedback on the CARD4L thresholds to meet interoperability requirements; expansion beyond Surface Reflectance in ARD including SAR use; more user guidance and feedback.

Two sets of case studies have been pursued to explore synergy between FDA and CARD4L: one set focused data access, and one on data users (GFOI and GEOGLAM).

Steve Volz (NOAA/SIT Vice Chair) asked how these studies may be integrated with the commercial offerings (e.g. 1-5m), which are now readily available. Gene noted the scope of this study was focused on moderate resolution (e.g. down to 10m), but connections to both finer (<10m) and coarser (e.g. MODIS/Sentinel-3 class) resolution imagery should be explored in future. Steve suggested that the handoffs across the framework should address the full spectrum of user needs. Josef Aschbacher (ESA) agreed and highlighted the need to understand the contribution from new commercial space start-ups in addition to the high-fidelity reference missions like Landsat and Sentinel. Adam Lewis (GA, LSI-VC) suggested the scope could easily be broadened around the core proposition of interoperability, and radar and small satellites could be added.

There was some debate around the need for the organisational way forward for these related activities within CEOS. Stephen Briggs (ESA) noted public space agencies and CEOS need to consider (again) the need for integration of commercial data sources going forward. Mauro Facchini (COM) noted the possibility of different modes of interaction with the private sector, for example around standards. Frank Kelly (USGS/CEOS Chair) noted the trends in EO data usage and how market drivers will influence much of what CEOS agencies do in the future, and that we need to watch issues like cloud storage and processing. Stephen Briggs stressed that our vision should be for optimal access and use of EO data rather than how to engage with the private sector. Mike Freilich (NASA) noted that the rise in private sector contributors may change the dynamic in future.

## 5. Analysis Ready Data (ARD)

Adam Lewis (GA) recalled that CEOS Analysis Ready Data for Land (CARD4L) Product Family Specifications (PFS) have been developed for radar backscatter, surface reflectance, and land surface temperature. Detailed input to the draft Specifications was received from multiple sources over the period June-September 2017. This has significantly improved the documents, and has improved awareness of CEOS leadership in this area. More formal or structured approaches to capturing the benefits to users may be needed.

The Future Data Architectures *ad hoc* Team (FDA-AHT) has asked that LSI-VC take steps to develop and implement a strategy to promote the CARD4L framework to data providers, and, to engage with the task of expanding CEOS ARD beyond land to other domains such as Oceans and Atmosphere. This will go forward as a recommendation from the FDA *ad hoc* Team.

LSI-VC will now move into an implementation phase, which will:

- develop the process for datasets to be assessed as CARD4L;
- identify data products that are on track to become CARD4L;
- monitor and communicate progress of individual products toward CARD4L; and,

- ‘road-test’ the PFS, evaluate, and if necessary updated, on an annual cycle based on the implementation experience.

LSI-VC plans to engage with user communities, e.g., through GFOI and GEOGLAM, to capture and communicate user experiences of ARD/MRI; and will take steps to promote the CARD4L framework to data providers. These include using the CEOS web site to communicate progress toward CARD4L products.

Selma Cherchali (CNES) noted that CNES, through the THEIA Land Data Center, is providing near-real time surface reflectance products from Sentinel-2 over many countries and areas around the world. Steve Lebahn (USGS) noted that the expectation is that USGS will move to surface reflectance as its standard product in Collection 2. Ivan Petiteville (ESA) suggested that consultation with Copernicus Services users would be a good expansion for the CARD4L consultation process. Mark Dowell (COM) noted that the Copernicus Global Land Service effort is aware of CARD4L, and the need for the community to have clarity in referencing CEOS specifications in their technical work. Pascal Lecomte (ESA) suggested including a digital object identifier (DOI) in the citation process.

<b>SITTWS-2017-01</b>	CEO	Explore process to support formal traceable citation of CEOS specifications (e.g. for ARD), including reference to Digital Object Identifier (DOI) standard where applicable.	CEOS Plenary
	<i>Rationale: In order to promote CEOS standards and documentation, the documentation will need to be made consistently traceable, accessible, and referenced.</i>		

## 6. CEOS and Open Data Cubes

Brian Killough (NASA/CEOS SEO) reviewed the background of Data Cubes, which are currently focused on time series analysis with the overall goal to provide a software solution, which will increase the potential impact of EO satellite data. The CEOS Data Cube is an implementation of the broader Open Data Cube (<http://opendatacube.org>) that has been developed as an initiative of several CEOS agencies and groups (CEOS SEO, CSIRO, GA, USGS, UKSA). The SEO is working towards a goal of having 20 operational Data Cubes in the next five years (by 2022), and is making good progress towards this objective.

Adam Lewis (GA) noted that Digital Earth Australia (DEA), another derivative of the original Data Cube activities, was funded because of the perceived potential to revolutionise government use of EO data and the potential to provide private sector services.

Brian noted plans are in place to leverage the experience of several operational implementations to expand the presence of Data Cubes (e.g. Switzerland for Georgia, Moldova, the U.K. for Solomon Islands, Vanuatu, Nauru, Taiwan for Honduras). He also noted progress with World Bank to support the deployment of a Data Cube in Uruguay for an agriculture and water quality project, with direct links to DINAMA (UN-SDG statistical agency).

There are four 1.5h Data Cube side events planned for GEO-17 on 23<sup>rd</sup>-24<sup>th</sup> October, each with a different Data Cube topic.

**CEOS-WP:** Section 3.6, Obj/Dev FDA-2 thru FDA-7



## 7. GEO Status Report

André Obrégon (GEO Secretariat) provided an update on recent developments in GEO's top three focus areas: SDG, Climate, and Disasters.

**SDGs:** GEO has published a set of case studies in support of GEO's EO4SDG Initiative.

**Climate:** GEO has identified climate as a 'Priority Engagement Area', and in particular in support to the Paris Agreement. There was a kick-off meeting for the GEO Carbon and GHG Initiative in July which started the process of establishing steering and governance groups.

**Disasters:** GEO is focusing its support in disaster resilience. A data readiness review came out of the recent disasters meeting in Cancun which provides important information on potential observational gaps with respect to disasters.

André noted that preparations are underway for the GEO Plenary 23<sup>rd</sup>-27<sup>th</sup> October in Washington, D.C.

### ***GEO Programme Board Report***

Jonathon Ross (GA/CEO) provided an update on the recent GEO Programme Board meeting. He noted that overall the Board is progressing well in consolidating the Work Programme, and CEOS engagement is in good shape. He noted the Board could benefit from broader representation, in particular from developing countries. The next version of the GEO Work Programme will be better indexed and organised, and it is hoped that this will increase utility and uptake.

### ***GEO Executive Committee Report***

Stephen Briggs (ESA) provided an update on GEO ExCom activities, noting Steve Volz is taking up the lead Co-Chair role on behalf of USGEO. ExCom has overall been operating smoothly, with few contentious issues raised. Engagement with the commercial sector has been a significant topic, and will feature in one of the four panels to be presented at GEO Plenary. Steve Volz (NOAA/SIT Vice Chair) noted that there will be a panel on International Finance Institutions (IFI) at GEO Plenary to try and increase visibility within those organisations. Mauro Facchini (COM) asked about the CEOS intervention at GEO Plenary, and the need for COM to report on behalf of CEOS. Mauro asked if there was a need to put more emphasis on one panel or another, understanding this is the new format for GEO Plenaries which makes interventions a little more delicate since they cannot be coordinated beforehand. Stephen Briggs noted that there is now no formal Plenary session for countries or Participating Organisations to make a statement. Written statements can be submitted, and a summary listing ongoing CEOS activities would be sufficient.

## 8. CEOS Water Coordination

Stephen Briggs (ESA) provided an overview of current CEOS Work Plan support to water activities, and noted that there was significant discussion on this topic during the VC/WG day which will be reported on in a subsequent session. He reviewed the main water-related activities in which CEOS is engaged.

**GEO Water Strategy:** CEOS responded to this Strategy [WAT-3, WAT-4], though it is unclear whether this provided a comprehensive picture of the user community requirements.

**AquaWatch:** Improve water quality in coastal and inland waters [WAT-5].

**GEOGLOWS:** Provides a framework for EO to contribute to mitigating water challenges; freshwater focused per GEO SBA.

**GEO Oceans and Society: Blue Planet:** Observational programmes devoted to ocean and coastal waters [WP section 3.9].

**COVERAGE:** Coherent set of data products from the four oceans VCs; presented their status and progress during the VC/WG Day.

**UN GOOS and SDGs:** In relation to SDG-6 and SDG-14.

Selma Cherchali (CNES) presented a summary of GEOGLOWS development and expectations, noting that Paul DiGiacomo is the CEOS representative to GEOGLOWS. She noted that the need for Water Cycle information has never been greater due to the increased velocity of the Cycle due to climate change, and anthropogenic pressures. Information drivers include climate predictions, improving models, and finer scale predictions. Selma reviewed some of the rationale for GEOGLOWS, as well as some of the linkages being made, including amongst many of the water activities that CEOS is supporting. GEOGLOWS policy drivers include biodiversity, finance, the SDGs, disaster risk reduction, and the Paris Agreement.

The first GEOGLOWS Steering Committee meeting took place in May 2017 in Tuscaloosa, USA. At this meeting, the membership and Terms of Reference were confirmed; a second Co-Chair was agreed (Rose Alabaster); and it was agreed to seek a third Co-Chair to address the technical aspects of observation and information systems and data sharing. Several working groups have been defined, including one to look at the development of Essential Water Variables (EWVs). GEOGLOWS intends to reference, enhance, and improve upon the existing GEO Water Strategy and the CEOS response.

Mark Dowell (COM) noted Paul DiGiacomo's linkage across GEOGLOWS and AquaWatch is helpful, and that Peter Sullivan, as the manager of the Copernicus EMS, is engaged and this represents a contribution from another CEOS agency.

**CEOS-WP:** Section 3.5, Obj/Dev WAT-4, WAT-6; Section 3.9, Obj/Dev BP-1 thru BP-4

## 9. GEO Global Agricultural Monitoring Initiative (GEOGLAM)

Brad Doorn (NASA) reported on CEOS progress and activities in support of GEOGLAM:

- the G-7 agriculture ministers reaffirmed their support for GEOGLAM at their meeting in Berlin in early 2017;
- GEOGLAM has selected a new Programme Director, Ian Jarvis, Agriculture and Agri-Food Canada, to start in autumn 2017;
- a number of important activities are underway: SAR inter-comparison activities with JECAM; crop classification tools adapted to smallholder agriculture; a platform integrating a spatialized crop model and satellite data for West Africa; an open source Sen2-Agri system to support the uptake by national and GEOGLAM partners; NASA Distributed Active Archive Centers (DAAC) is funding GEOGLAM to implement a Data User Study Pilot for Agriculture;
- short-term priorities include: dense optical time series exploitation, and dense SAR time series exploitation;



- a GEOGLAM EO requirements refresh is ongoing; and,
- GEOGLAM wants to engage with LSI-VC to get support on ARD formats including for SAR data;
- there will be a request to Plenary to renew the *ad hoc* Working Group, in particular to work on challenges around data product generation and delivery.

Steve Volz (NOAA/SIT Vice Chair) asked if there is a part of the GEOGLAM R&D work plan that CEOS agencies could be expected to contribute to in the future, and Brad suggested there are probably a number of topics (e.g. data processing and handling) and that he expects GEOGLAM to remain engaged with the space agencies indefinitely.

Stephen Briggs (ESA) noted that a space agency group to sustain engagement with GEOGLAM needs to continue, and the question is whether this will be as an *ad hoc* Working Group, or part of a broader effort along with LSI-VC and SDCG.

André Obrégon (GEO Secretariat) noted that water and agriculture remain important areas of activity for GEO.

**CEOS-WP:** Section 3.3, AGRI-4, AGRI-8, AGRI-9

## 10. GFOI and SDCG

Stephen Ward (SDCG Secretariat) presented an update on CEOS support to the Global Forest Observations Initiative (GFOI) via the Space Data Coordination Group (SDCG), including implications of GFOI Phase 2. The GFOI Leads group is expanding as a part of GFOI Phase 2, with invitations to ESA, Germany, and the UK currently extended, and with positive responses anticipated.

GFOI Phase 2 will feature:

- a strong country emphasis – reflecting the development aid finance nature of funding;
- improved mechanisms for coordination: gap analysis and needs assessments; joint work planning for priority needs/gaps; and, joint implementation of work plans;
- proposal for Office to have budget to support some joint implementation that directly benefits countries; and,
- UK involvement could bring large-scale Overseas Development Aid (ODA) funding and would be a possible game changer.

2017 represents a milestone in that all countries that wish to report wall-to-wall on forest cover should have the minimum EO data required to do so. This is something that should be highlighted, including via CEOS agency public relations channels.

The emphasis turns to data uptake and application, consistent with GFOI Phase 2, including pilot activities (Colombia, Vietnam), pursuing inclusion of Early Warning as GFOI activity (possible basis for the long-promised cooperation with WRI/GFW), and Element-3 agencies actively contributing to R&D activities.

There are significant capacity challenges ahead for SDCG, including the prospect of having just a single Co-Chair (ESA, with USGS not replacing Gene at present), and no secretariat support.

Stephen Briggs (ESA) noted that GFOI is in a mixed position as a CEOS and GEO success story that we risk losing if CEOS agencies can't continue to support it. He noted the need for the nomination of two CEOS representatives for the new GFOI Data User Advisory Group (DUAG), and an additional

one or two Co-Chairs for SDCG along with ESA (Frank Martin Seifert). The success of SDCG has been dependant on support for the secretariat, and this support could be included along with any nomination for a Co-Chair role. Stephen noted it would be better to be coming into Plenary with a solution proposed.

<b>SITTWS-2017-02</b>	CEOS Principals	Contact CEOS Lead for GFOI with offers to provide candidates for SDCG Co-Chair alongside ESA, and with suitable support capacity	ASAP
	<i>Rationale: Effective leadership and SEC capacity for SDCG is vital for continued effectiveness of the CEOS contribution to GFOI as it enters Phase 2. Integration of the SDCG Co-Chair and secretariat support may need to be considered.</i>		
<b>SITTWS-2017-03</b>	SDCG EXEC	Liaise with CEOS Chair and CEOS SEC on the way forward for external promotion (including with GEO) of the GFOI Global Baseline coverage achievement in 2017	CEOS Plenary Press release already issued
	<i>Rationale: To promote the space agency success in providing satellite data coverage to support any country wishing to monitor their forests using IPCC-compliant GFOI methods and guidance (MGD).</i>		

## 11. Outcomes from the Trial Joint Meeting of LSI-VC, SDCG, and GEOGLAM

Brad Doorn (NASA/GEOGLAM *ad hoc* WG Co-Lead) presented a brief update on potential linkages between GEOGLAM and the LSI-VC, the first of which has been around the requirements process.

Gene Fosnight (USGS) stressed that the SDCG Baseline Acquisition Strategy is considered a success as the EO community transitions from a period of data scarcity to data abundance, providing today yearly multiple coverages of global forested area. Landsat and Sentinel-2 transitioning to formal ARD surface reflectance products in 2018/2019. Sentinel-1 toolkit and ALOS-2 mosaics provide global core SAR ARD for user applications. GFOI Phase 2 has a re-emphasis on user driven requirements and CEOS must ensure that any change in structure does not lose the connection to the GFOI flagship and its user perspective.

Adam Lewis (GA) reported on the LSI-VC meeting and the progress on ARD and MRI. He noted that GFOI and GEOGLAM can help bring user perspective. Conclusions from the recent joint meeting included:

- thematic teams must continue to engage with their user communities - the mode of engagement with user communities demonstrated by GEOGLAM and SDCG is highly successful for CEOS and should continue, with no benefit in 'putting these under' LSI-VC;
- it is anticipated that further joint would be beneficial, and co-location of meetings and shared discussion on common topics has the potential to identify significant synergies and allow common interests to be explored more effectively;
- co-location of meetings poses some logistical challenges – larger venues are needed – yet reduces the number of meetings that need to be arranged;
- GEOGLAM and GFOI meetings with user groups would continue, and could not be replaced with joint meetings;

- the agenda for future joint meetings are likely to need some ‘tweaking’, e.g., to have more joint sessions and less parallel sessions; and,
- a number of areas of shared work are emerging that would provide the subject material for joint meetings, such as: capturing user experiences in interoperability and analysis ready data, and feeding these back into CEOS e.g., Product Family Specifications; the increasing maturity of the requirements gathering process, building on the work of GEOGLAM; the use of a common requirements gathering framework to capture future requirements, anticipating that additional requirements will emerge as Earth observation is aligned with GEO and delivery to support the Sustainable Development Goals.

Stephen Briggs (ESA) welcomed the positive outcomes from the joint meeting and the clear rationale for maintaining the individual links to GFOI and GEOGLAM, as well as periodic joint meetings.

## **12. GEO-XIV Plenary: CEOS Preparations and Deliverables**

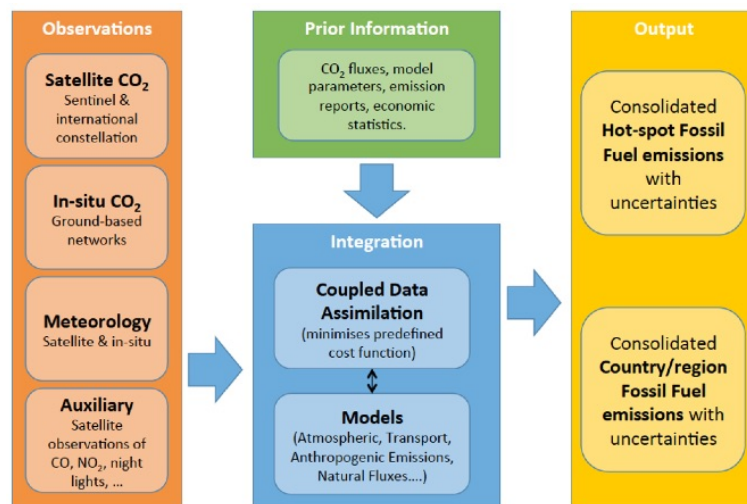
Jonathon Ross (GA) reviewed plans for GEO Plenary, noting that one of the themes that may be of interest for CEOS is around engagement with the commercial sector. He reviewed plans for the four GEO Plenary panel discussions. Brian Killough (NASA) reviewed plans for the CEOS exhibition booth at GEO Plenary. The SEO and USGS are covering the costs, and Brian will be working with interested agencies to develop the content.

Stephen Briggs (ESA) suggested CEOS review the effort invested into a statement for GEO that few people read. Mauro Facchini (COM) noted that at least a statement confirms consensus of CEOS agencies on the inputs, though agreed that some CEOS delegation briefing points for the panels may be a better investment.

## **13. Incoming CEOS Chair Carbon Coordination Activities**

Mark Dowell (COM) provided some additional detail on plans for the 2018 CEOS Chair CO<sub>2</sub> and Carbon activities:

- he noted the Nov 2015 report: *'Towards a European Operational Observing System to Monitor Fossil CO<sub>2</sub> Emissions'*, with the concept underpinned by strong user requirements - based on international commitments and corresponding EU Policy implementation; strong international engagement will be needed;
- an COM Task Force is underway for this work: Subtask A (led by COM DG-GROW & ESA) focuses on the space component; Subtask B (led by COM DG-GROW & COM DG-JRC) focuses on the end-to-end monitoring system;



- a review of high level system detection, monitoring, and assessment requirements will be considered, with trade-offs between accuracy and spatial and temporal resolution to be included; and,
- the COM project aims to take advantage of the AC-VC White Paper;

Three specific activities are foreseen for advancing this effort in 2017-2018:

- facilitate the completion and follow-on activities of the **AC-VC whitepaper** on defining an optimum constellation for CO<sub>2</sub> and GHG monitoring;
- place the space segment in the **broader context of a fully sustained system for CO<sub>2</sub> monitoring**; and,
- **advance the relationship with CGMS for an operationally implemented** and sustained observation capability, and consider establishing a formal working relationship between CEOS and CGMS as with the successful ongoing relationship on Systematic Observations of ECVs in support of UNFCCC.

The COM plans a workshop on “placing the space segment in the broader context of a fully sustained system for CO<sub>2</sub> monitoring,” bringing together these different stakeholders to define best practices and synergies, exploring possibilities for common approaches to some of the system development. They plan strong engagement of CGMS, as well as CEOS Associate members such as WMO, with the draft proposal for the workshop being late May or June 2018, somewhere in Northern Italy.

A brief discussion followed:

- Stephen Briggs (ESA) noted that this effort responds to an action agreed at the CGMS meeting in June 2017.
- Stephen also noted the unique role of the COM as a governing body and not a traditional space agency or technical body, and stressed the importance of the work of the AC-VC on their paper.
- Osamu Ochiai (JAXA) noted that Japan’s Ministry of Environment (MoE) has an interest in regional coordination, and asked how sub-task B could support this interest, and Mark confirmed that this is the intention of sub-task B.
- Osamu also asked about linkages to GEOCARBON, and Mark noted that this connection hasn’t been made but future links are possible with GEOCARBON and WMO IG3IS.

- Steve Volz (NOAA/SIT Vice Chair) asked about the level of engagement expected from the broader non-satellite based community for next year’s workshop, and Mark noted that an open approach to participation is planned with modelling, inventory, and other counterparts engaged by the space agencies involved.
- Alain Ratier (EUMETSAT) noted the importance of referencing the Paris Agreement call for measurement and reporting on emissions (rather than control), and Stephen Briggs noted that the GCOS implementation plan also takes this view. Alain also stated that EUMETSAT will fully support this CEOS Chair initiative.
- Stephen Briggs hoped that both tasks of the COM initiative might evolve to become global in scope.

#### **14. CEOS Carbon Strategy Implementation**

Mark Dowell (COM) provided an update on the CEOS Carbon Strategy implementation, noting that reference materials are available from yesterday’s discussions. The context for this work is the GCOS action for the development of a carbon monitoring system in support of, amongst others, the Paris Agreement. Mark noted that this is one of the most cross-cutting activities in CEOS with almost all groups involved. He noted:

- LSI-VC has completed actions CARB-08-03 and CARB-08-04;
- AC-VC have started drafting a white paper to define the key characteristics of a global architecture for carbon (CO<sub>2</sub>, CH<sub>4</sub>) measurements from space, and expect to deliver an interim report for Plenary 2017, and the final report for Plenary 2018. The material from this white paper are useful for the input into the IPCC Inventories process that JAXA is leading;
- LSI-VC is exploring the adoption and generalization approaches (e.g. GEOGLAM) to apply to other thematic areas;
- WGClimate is looking at consistent ECV Carbon products, taking advantage of ECV Inventory output to produce a subset of ECV Products contributing to Carbon Strategy. This action is addressing several items in the Carbon Strategy implementation;
- WGCV is looking at validation frameworks and protocols, including a CEOS Land Validation Framework;
- the NASA-GEDI Science Team is compiling a global dataset of coincident field and airborne LIDAR, and this has been taken up by the CEOS-LPV Biomass focus area activities; and,
- CEOS is engaged in a number of tasks from the GEO Carbon and GHG Initiative implementation plan.

**CEOS-WP:** Section 3.2, CARB-12 thru CARB-19

#### **15. Update on IPCC Guidelines**

Akiko Suzuki (JAXA) provided an update of the IPCC Guidelines for national GHG inventories:

- parties to the Paris Agreement are required to submit Nationally Determined Contributions (NDC) every 5 years; reporting of national GHG emissions and removals is required to comply with the guidelines adopted by IPCC; the guidelines are important to enhance transparency framework for building mutual trust and confidence and promote effective implementation of the Paris agreement; developed in 2006, and will be refined in 2019;

- Japan’s National Institute for Environmental Studies (NIES) is drafting a methodology document to explain how to utilise satellite data in the measurement and inventory process; and,
- JAXA shared their concept of “Road to IPCC Guidelines” with ESA, CNES and DLR and each Head of Agency agreed to cooperate; JAXA, ESA, CNES and DLR recognized that enhancement of accuracy of satellite GHG data through cross-calibration and validation was essential for engagement with IPCC.

Akiko summarised the conclusions of the side meeting held the day before:

- CEOS should understand the timeline for the IPCC Guidelines Refinement: the 1<sup>st</sup> order draft will be released by end of November 2017, and expert Review of the draft will take place in December 2017 – January 2018;
- NIES will publish the GHG Guidebook by March 2018; CEOS AC-VC to review the Guidebook in October-November 2017;
- CEOS AC-VC white paper could also be input to IPCC authors, with the draft expected to be available by the end of 2017;
- recognizing the importance of agency comments on the 1<sup>st</sup> order draft of the IPCC Guidelines during Expert Review, JAXA proposes CEOS and individual agencies submit comments such as achievements of space-based GHG measurements;
- this is a long-term process, recognising the respective process of IPCC guidelines update. Topics such as mitigation and adaptation can be next steps; and,
- CEOS AC-VC asked to input ideas for the Incoming CEOS Chair (COM) to follow-up.

Stephen Briggs (ESA) stressed the need to understand the timeline for inputs, and also the need to view this as a long-term commitment for CEOS. Mark Dowell (COM) asked for visibility of the Road to IPCC Guidelines document. John Remedios (UKSA) noted the UK engagement in science aspects of UK guidelines, and asked whether there are any groups in the process with whom space agencies should engage.

SITTWS-2017-04	AC-VC	Invited to input ideas from its White Paper that could be followed up by CEOS Chair in 2018	CEOS Plenary
	<i>Rationale: COM is willing to advance activities identified as necessary by AC-VC during the 2018 CEOS Chair year.</i>		
SITTWS-2017-05	AC-VC	Provide draft White Paper to IPCC Review process	January 2018
	<i>Rationale: The 1<sup>st</sup> Draft Review period for the updated IPCC Guidelines is a critical opportunity for advocacy of inclusion of space data and its role.</i>		
SITTWS-2017-06	CEOS agencies	Encouraged to actively engage, individually and directly, with the IPCC review process and to advocate for the role of space observations.	January 2018
	<i>Rationale: The 1<sup>st</sup> Draft Review period for the updated IPCC Guidelines is a critical opportunity for advocacy of inclusion of space data and its role.</i>		
SITTWS-2017-07	JAXA & CEOS Chair	JAXA will inform CEOS members of the IPCC 1st order draft when available (expected late Nov 2017). CEOS Chair will coordinate development of consolidated CEOS agency comments and their input to IPCC during the review window	November 2017 – January 2018



	<i>Rationale: CEOS has agreed to engage in the IPCC Guidance update review process.</i>		
<b>SITTWS-2017-08</b>	CEOS agencies	Provide comments on the AC-VC white paper	28 February 2018
	<i>Rationale: The AC-VC white paper is an important part of the incoming CEOS Chair Carbon actions and of the CEOS engagement in the IPCC Guidance update.</i>		
<b>SITTWS-2017-09</b>	JAXA and AC-VC	JAXA to provide a draft of the NIES GHG Guidebook and AC-VC will lead CEOS review and feedback (by end Nov)	Late September 2017
	<i>Rationale: AC-VC is best qualified to review the input to IPCC.</i>		

## 16. Essential Climate Variables (ECVs) and the ECV Inventory

Jörg Schulz (EUMETSAT) presented a summary of the ECVs and ECV Inventory, noting that the Inventory provides verified information on currently available, or planned, Climate Data Records principally derived from CEOS and CGMS agency satellites or their combination. The Inventory has been populated with the support of ~100 individuals across agencies, and there are now approximately 900 data records in the inventory, which is roughly three times more than the number of records resulting from the previous inventory call. Jörg presented an overview of the contents of the Inventory.

Jörg noted that, given the huge response from space agencies, the activity to build up the ECV Inventory took much longer than expected, with the record verification step being crucial and requiring extensive, time-consuming, interactions with responders. Following the completion of the verification step in March/April of this year, the gap analysis activity started making use of experts organised in domain teams. These domain teams compared the properties of the various inventory record entries with the GCOS requirements and have started identifying gaps of various types (e.g. shortfalls in record processing, missed opportunities to create CDRs from Fundamental Climate Data Records (FCDRs), predicted gaps in instrument availability, etc.). Part of the gap analysis process relies on the capability to cross-refer to instrument-level databases such as the CEOS MIM and WMO OSCAR databases. Some technical obstacles were identified in this respect during the gap analysis process, including divergence of nomenclature between GCOS, MIM and OSCAR, and these aspects will shortly be addressed, including with CEOS MIM team support.

The crucial role of the COM-funded support for the inventory population and verification activities, was gratefully acknowledged.

The next steps include:

- integrate the first summary findings from the gap analysis within the GCOS IP response as answers to GCOS Actions 11 and 12 (see next agenda item);
- publish the ECV Inventory V2.0 on <http://climatemonitoring.info/> in October 2017;
- complete the gap analysis of the inventory content at the ECV product, level based on a prioritised list of ECV products;
- complete the gap analysis report including recommendations and actions relating to this V2.0 of the ECV Inventory and make it available to CEOS SIT-33 for endorsement (in plenary session);

- perform a lessons learnt exercise and thereafter propose a methodology for future updates of the ECV Inventory and gap analysis;
- work with WGISS to assess and ensure the data discovery and accessibility in the Inventory; and,
- support a WMO workshop on ECV Inventory Use for Climate Monitoring from Space.

A brief discussion followed:

- Ivan asked if going forward, there will be 100+ points of contact, and Jörg noted that for each agency there is a focal point, and they help to engage dataset experts within the agencies, which is where the numbers of contacts grow. In the future, it is expected that there will be less work in this area, compared to the initial population of the database.
- Mark stressed the enormous achievements over the last 2 years and highlighted the strategic importance of the ECV Inventory, and the very significant efforts involved in pulling it all together.

## 17. Space Agency Response to the GCOS IP

Pascal Lecomte (ESA/WGClimate Chair) reviewed the status of the Space Agency Response to the GCOS IP, noting that is due to be presented to the UNFCCC Secretariat roughly a month ahead of the COP-23/SBSTA-47, on 6<sup>th</sup> October 2017. Inputs have been received, and consolidated into Version 0.111, with a complete review of the document completed at WGClimate #8 earlier this week. The target is for a 20-30 page document outlining the broad context, detailed implementation, a meta-response to the product requirements table, and an annex with responses to detailed actions. The Response will also attempt to address GCOS Actions 11 and 12.

Action G11: Review of availability of climate data records	
Action	Provide a structured, comprehensive and accessible view as to what CDRs are currently available, and what are planned to exist, together with an assessment of the degree of compliance of such records with the GCOS requirements for the ECV products indicated in Annex A
Benefit	Improve planning of satellite-derived climate data acquisition
Who	CEOS/CGMS Working Group on Climate for records contributing to the ECV products that are indicated in Annex .
Time frame	End 2016 and updated every two years thereafter.
Performance indicator	Online availability of an inventory of current and future CDRs, together with an assessment of compliance with GCOS requirements
Annual cost	Covered by CEOS and CGMS agencies

Action G12: Gap-analysis of climate data records	
Action	Establish a gap analysis process and associated actions, to: (a) address gaps/deficiencies in the current available set of CDRs; and (b) ensure continuity of records, and address gaps through the appropriate planning of future satellite missions for the ECV products indicated in Annex A
Benefit	Increase the utility of the CDRs
Who	CEOS/CGMS Working Group on Climate for records contributing to the ECV indicated in Annex A
Time-frame	End 2017, and updated every two years thereafter.
Performance indicator	Availability of gap analysis and associated action plan
Annual cost	Covered by CEOS and CGMS agencies

WGClimate doesn't plan to submit the Gap Analysis directly to SBSTA as a report, but to include a summary in the Space Agency Response, with a technical annex to follow in early 2018. A mapping of the GCOS IP to the Space Agency response will also be included as an annex to the report.

Pascal summarised the next steps:

- completion of the Executive summary by September 18<sup>th</sup>;
- document ready for review by CEOS and CGMS September 25<sup>th</sup>;
- review process by CEOS and CGMS (2 weeks) through the CEOS sec and the CGMS secretariat;

- same process as in 2012 for the previous version of the Space Agency Response;
- document to be sent to UNFCCC secretariat by 6<sup>th</sup> October 2017; and,
- presented at COP-23/SBSTA-47: 6<sup>th</sup> November 2017.

The schedule for the SBSTA meeting should be known by the end of September, though the side events are not currently known. Usually, most of the technical side events will be held in the first week, but Space Agency statement could be scheduled any time.

<b>SITTWS-2017-10</b>	CEOS Chair & agencies	Coordinate review by CEOS and CGMS of the Space Agency Response to the GCOS IP (to be presented to SBSTA) with support from WGClimate	From 2 October (Two-week window)
	<i>Rationale: CEOS has committed to maintaining an active response to the GCOS IP as it evolves as the guiding light for its climate observation coordination.</i>		

## 18. SBSTA 47 and COP-23 Reporting

Pascal Lecomte (ESA) explained expectations for COP-23, noting that there will be a CEOS/CGMS Statement to SBSTA-47 summarising the current state of coordination in support of climate observations. GEO, GCOS, and WMO have proposed side events, as well as other CEOS agencies (e.g. ESA, JAXA, COM). There will likely be some consolidation proposed, but we are still waiting for confirmation and logistics information from the UNFCCC Secretariat. WGClimate intend to present the Space Agency Response to the GCOS IP in the context of one of these side events in coordination with GCOS.

GCOS has also proposed, and had accepted, a UN system-wide side event which will be given by WMO, IPCC, GCOS and the World Food Program talking about their role as practitioner in applying science information. The GCOS IP is featured there including talking about climate indicators, though no CEOS representative as originally planned.

Stephen Briggs (ESA) suggested that all agencies provide an update when they are aware of a confirmed COP side event. André Obrégon (GEO Secretariat) noted that GEO has also applied for an exhibition booth in the first week, and if they are successful, they plan to use it to highlight the activities of Earth observation providers.

Mike Freilich (NASA) suggested, and it was agreed, that the Statement will go farther toward showing the major progress made if it indicates absolute numbers of records. For example, to indicate a tripling of the number of records, and include the current number.

### **CEOS-WP: Section 3.1, CMRS-19**

<b>SITTWS-2017-11</b>	CEOS agencies	CEOS agencies to inform CEO of any plans for side events at COP-23 and for representation at COP-23 - especially at working groups such as RSO	ASAP
	<i>Rationale: Knowing attendance and plans for COP-23 will help optimise engagement by CEOS</i>		
<b>SITTWS-2017-12</b>	CEO, M Dowell, P	To draft CEOS speaking points for participation in COP-23	CEOS Plenary

	Lecomte		
<i>Rationale: In order to ensure CEOS activities and priorities are represented (to the extent possible) by CEOS agencies at COP-23, a set of talking should be prepared.</i>			

## 19. Synthesis Report from VC/WG Day

Jean-Louis Fellous (SIT Chair Team) reviewed the history of the VC/WG day, noting that they have been successfully held in conjunction with the SIT Workshop by CNES and ESA since 2014, with two also being held by the NASA SIT Chair Team in 2012 and 2013. The agenda for this year’s instalment covered water, the extension of ARD to atmosphere and ocean, and carbon / climate.

### *Water Session Report*

The session was moderated by Osamu Ochiai (representing Steven Neeck, P-VC) and Paul Chang (OSVW-VC), and started from the recognition that CEOS had struggled over the past decade to sort out observation and product requirements and priorities from the diverse “water” communities. Several (new) projects are flourishing, dealing with different segments of “water” from various perspectives: saltwater, freshwater, coastal waters, quality and availability of water, physical oceanography, etc. These projects – GEOGLOWS, AquaWatch, COVERAGE, Blue Planet, others – are working to clarify their common and specific requirements and priorities.

The proposal to hold a dedicated ‘Water from Space’ workshop in 2018 with the goal for CEOS to understand how best its observations may be organized in order optimally to serve the various water community initiatives, and to encourage a coherent response from among them. A small committee should be tasked to prepare the workshop and to develop a short document spelling out this goal in a clear manner. The composition and mandate of the task group and the above-mentioned document should be ready for presentation and endorsement by CEOS Plenary in October.

Steve Volz (NOAA/SIT Vice Chair) asked about the timeline to have a proposal for consideration at Plenary, and Stephen Briggs suggested there only needs to be sufficient detail for Plenary to consider.

<b>SITTWS-2017-13</b>	CEOS Chair	CEOS Chair to task a small committee to prepare a water coordination planning workshop and to develop a short document defining the details (date, location, objectives)	To Be Presented for Endorsement at CEOS Plenary
<i>Rationale: A dedicated workshop in 2018 with the goal for CEOS to understand how best its observations may be organized in order optimally to serve the various water community initiatives, and to encourage a coherent response from among them. The focus should be on freshwater, and is not intended to address the whole of oceanography.</i>			

### *ARD Extension Session Report*

The session was moderated by Adam Lewis (LSI-VC), Andy Mitchell (WGISS) and Ken Casey (SST-VC), and the discussion started from the recognition that the ARD approach successfully developed by the LSI-VC (CARD4L) had the potential to be extended as appropriate to other domains (atmosphere,

ocean). It was recognized that there are also similar activities which have matured (e.g. GHRSSST), but also unmet aspirations (e.g. Ocean Surface Vector Winds), and that WGISS has developed tools and friendly working environment in support of such ARD activities. There is a need to demonstrate and emphasize the benefits of ARD to help justify the extra efforts and resources associated with their development. The importance of data assimilation was also noted and the idea was expressed that the overall topic is an FDA issue.

The following outcomes were agreed during the session:

- VC’s are kindly asked to review the CARD4L framework developed by the LSI-VC to identify any components that would be of wider value. Feedback to LSI-VC would also be welcome; and,
- the FDA *ad hoc* Team is kindly asked to include in its report a recommendation that CEOS take appropriate (and moderate) steps to progress a CEOS-wide ARD strategy.

#### *Climate/Carbon Session Report*

The Carbon/Climate session was moderated by Mark Dowell (Carbon Strategy Team), Pascal Lecomte and Jörg Schulz (WGClimate), with the remote participation of David Crisp (AC-VC). Pascal presented the status of the space agency response to the GCOS-IP, and Mark and Joerg reported on the ECV Inventory activity, with Mark presenting on the CEOS report to SBSTA. Comments are urgently welcomed, and approval is needed before Plenary (per action SITTWS-2017-10).

#### *Summary of the IPCC Side Event Discussion*

Pascal Lecomte (ESA) presented the summary of the IPCC side event discussion:

- CEOS should understand the timeline for the IPCC Guidelines Refinement:
  - o The 1st order draft will be released by end of Nov. 2017;
  - o Expert Review for the draft in Dec. 2017 - Jan. 2018.;
- NIES will publish the GHG Guidebook by Mar. 2018;
  - o CEOS AC-VC to review the Guidebook in Oct.- Nov. 2017;
- CEOS AC-VC white paper could also be input to IPCC authors;
  - o The draft will be available by end of 2017;
- Recognizing the importance of agency comments on the 1st order draft of the IPCC Guidelines during Expert Review, JAXA proposes CEOS and individual Agencies submit comments such as achievements of space-based GHG measurements;
- This is a long-term process, recognizing the respective process of IPCC guidelines update. Topics such as mitigation and adaptation can be next steps; and,
- CEOS AC-VC asked to input ideas for COM Chair follow-up.

#### *Issues and potential resolutions that may require SIT Chair support: AC-VC*

**Data Access Policies** enabling the Air Quality (AQ) Constellation objectives for open data exchange now relies on data access policies for the Korean and Chinese missions to be established by their organizations. CEOS-endorsed AQ constellation position paper (2011) recommended “establishing protocols for mutual open and timely data distribution” to collaboratively enhance the quality of data products from all missions, thereby extending a global focus to the observations. The initial missions include Europe’s Seintinel-4 and Sentinel-5P flying on MTG and MetOP-SG respectively, USA’s TEMPO, Korea’s GEMS, and potentially China’s Gaofen-5. NASA and the EU now have open data policies including Level-1b and Level-2 products. The request is for CEOS to actively engage in

(or continue) conversations with appropriate agencies in Republic of Korea and China to facilitate open sharing of satellite data between all partner space agencies.

**Unmet Air Quality Measurement Goals** While the emergent AQ Constellation is a success story, two measurement goals remain unmet: extending hourly AQ observations to the rest of the world and providing hourly CO vertical profile measurements with near-surface sensitivity. The emergent AQ constellation includes hourly geostationary (GEO) observations over Europe, East Asia, and North America, but air quality in the developing world is a growing societal challenge (increasing industrialization and population) with global impact. Extending GEO observational capability to the southern hemisphere and tropics will leverage experience and capabilities from the emergent missions to be an effective capacity-building activity. Encourage agencies to identify strategies to meet remaining AQ measurement goals, possibly including innovative funding and partnership approaches to build capacity in the developing world.

**Enable Joint AQ/GHG** Constellations for observing AQ and greenhouse gases (GHG) have developed separately but are highly interdependent, with similar emission sources (i.e., combustion) control AQ and GHG, AQ affects natural carbon cycles, modulating net GHG abundances, and simultaneous AQ and GHG observations provide better constraints on emission fluxes and transformation, critical for policy strategies. Atmospheric composition Observing System Simulation Experiment (OSSE) capability has matured rapidly, and AC-VC is fostering AQ and GHG OSSE development with involvement of ECMWF, ESA, Copernicus, NASA, JAXA, NIER, and others. International objectives for both AQ and GHG observations could be achieved more effectively through coordinated planning. Agencies should be encouraged to coordinate existing AQ and GHG OSSE capabilities to efficiently enable joint AQ/GHG satellite constellation studies.

*Issues and potential resolutions that may require SIT Chair support: SST-VC*

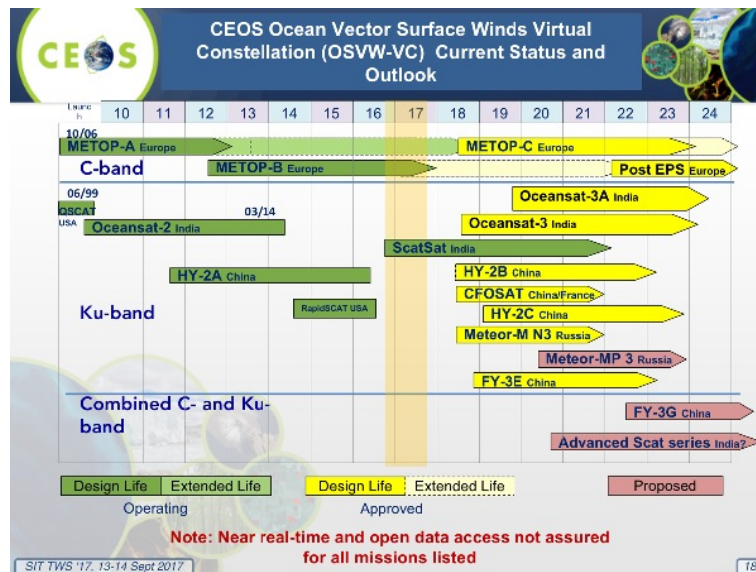
The SST-VC continues to stress the need for passive microwave (PMW) based SST observations, highlighting the importance of PMW SST observations in the ~7 GHz band, especially in high latitudes, regions of persistent cloudiness, and aerosol-impacted areas. This illustrates the current fragile state of the SST constellation to continue delivering those measurements into the future. The SST-VC would like to update the community on the status of coordinating through the SST-VC to enable greater data sharing and scientific exchanges to fill the coming gaps in PMW-based SST observations. CEOS is requested to coordinate and encourage its agencies to ensure the continuation of the existing capability and to facilitate the coordination of agencies to ensure continuity and redundancy of PMW for SST. This issue is also relevant to sea-ice products.

Ken Casey (NOAA) noted there will be a workshop on the MW SST continuity issue in early 2018 in the US. Jean-Louis noted that one of the key value added points of the VCs that they are able to prompt action on these kinds of gaps, and if these kinds of gaps aren't addressed over time, then people will begin to question their purpose.

*Case for Satellite OSVW Continuity*

Paul Chang reviewed the status and health of the OSVW Virtual Constellation.





The 2015 IOVWST meeting recommendation suggested that the optimum (minimum) OSVW constellation should include at least 3 scatterometers in orbits designed to roughly meet WMO requirements (observations every 6 hours), and should include one instrument in a non-sun-synchronous orbit for sampling the diurnal cycle, better mid-latitude sampling and provide inter-calibration. The group is considering whether the “business case” for satellite OSVW is strong enough, and if not then what needs to be done to improve the chances of realizing the optimum (minimum) satellite OSVW constellation.

There is a question about who “owns” satellite OSVW - e.g. Oceanography? Meteorology? – with three broad use categories:

- To monitor and understand climate scale phenomenon (NWP reanalysis fields tend to be used still);
- To monitor and understand short time scale weather/phenomena (operational weather monitoring and forecasting; and,
- To further our understanding of basic physical processes (scientific research).

The two current anchors in the OSVW constellation are ISRO and EUMETSAT, where EUMETSAT is an operational satellite agency with a justification by NWP, and ISRO is research agency with some operational components. There is a concern that operational weather monitoring and forecasting may not be a sufficient rationale by itself in the future, and so there may be a role for CEOS to document the essential (critical) satellite observations enabled by OSVW.

*Leadership changes and issues – WGDIsasters*

Stéphane Chalifoux (CSA/WGDIsasters) presented a summary of the WGDIsasters pilots and activities, and noted that NASA has nominated as the new Vice-Chair of the Group, subject to Plenary endorsement. Updates will also be provided on several Disasters tasks at Plenary:

- DIS-12 - Recovery Observatory Malawi and Nepal demonstrators final reports;
- DIS-12 - Recovery Observatory status update;
- DIS-13 - Landslide Pilot status update; and,

– DIS-15 - GEO-DARMA concept phase summary.

*Leadership changes and issues – WGISS*

Andy Mitchell (NASA/WGISS Chair) noted the WGISS Vice Chair position is currently open for nominations. This entails a four-year commitment to begin in November 2017.

*Leadership changes and issues – OST-VC*

Whilst OST-VC remains active, there was a leadership issue put to the attention of SIT-32. Leadership has changed with both former co-Chairs Philippe Escudier (CNES) and Hans Bonekamp (EUMETSAT) rotating out, and so a lack of Leads resulted in the lack of reporting to the SIT Chair Team and lack of participation in the SIT Chair tag up telecons since mid-016. This spring, EUMETSAT nominated Remko Scharroo as their new co-chair for the OST-VC, however the OST-VC was not able to report or participate in the tag up telecon in June-July 2017.

Last week, Juliette Lambin, a former CNES co-chair of the OST-VC and the successor of Pascale Ultré-Guérard, sent a message informing us that she is in the process of finding a new ‘ocean program manager’, who will come up soon, but not in time for the SIT Workshop. Noting that we have one co-Chair nomination from EUMETSAT, it was agreed that this issue should be revisited at SIT-33 to ensure that the CNES nominee has been followed-up.

Steve Labahn (USGS) noted there is an issue with WGCapD leadership, seeking a Vice Chair to begin in November 2017.

SITTWS-2017-14	VC Leads & LSI-VC	LSI-VC to provide VC’s with a package for review and feedback on the CARD4L framework - to identify any components that would be of wider value.	CEOS Plenary
	<i>Rationale: Broad consultation is needed to ensure CARD4L is fit for purpose.</i>		
SITTWS-2017-15	CEOS SEC and AC-VC	CEOS SEC will liaise with AC-VC and use regional SEC contacts to engage appropriate agencies in Republic of Korea and China to facilitate open sharing of satellite data between all partner space agencies	December 2017
	<i>Rationale: This data is important for realisation of the AQ Constellation objectives. Contacts with CMA may be helpful.</i>		
SITTWS-2017-16	SIT Chair	SIT Chair to confirm with CNES that the vacancy for OST-VC Co-Chair is filled prior to SIT-33	December 2017
	<i>Rationale: OST-VC leadership and reporting to CEOS has been disrupted for some time and needs a resolution. EUMETSAT has nominated a Co-Chair (Remko Scharroo).</i>		
SITTWS-2017-17	AC-VC and CEOS agencies	The AC-VC to produce a position paper on unmet Air Quality measurement goals. CEOS agencies to respond with strategies to meet these remaining AQ goals, possibly including innovative funding and partnership approaches to build capacity in the developing world	SIT-33
	<i>Rationale: While the emergent AQ Constellation is a success story, two measurement</i>		

	<i>goals remain unmet: extending hourly AQ observations to the rest of the world and providing hourly CO vertical profile measurements with near-surface sensitivity.</i>		
<b>SITTWS-2017-18</b>	AC-VC and CEOS agencies	The AC-VC to produce a position paper on OSSE capabilities that could efficiently enable joint AQ/GHG satellite constellation studies. CEOS agencies to coordinate existing AQ and GHG OSSE capabilities that could be used to fulfill this goal.	SIT-33
	<i>Rationale: International objectives for both AQ and GHG observations could be achieved more effectively through coordinated planning, and agencies should be encouraged to coordinate existing AQ and GHG Observing System Simulation Experiment (OSSE) capabilities to efficiently enable joint AQ/GHG satellite constellation studies.</i>		
<b>SITTWS-2017-19</b>	CEOS agencies	CEOS agencies to support continuity and redundancy of PMW for SST via the upcoming PMW workshop (April 2018, USA TBC)	April 2018
	<i>Rationale: The SST-VC continues to stress the need for passive microwave (PMW) based SST observations, highlighting the importance of PMW SST observations in the ~7 GHz band, especially in high latitudes, regions of persistent cloudiness, and aerosol-impacted areas.</i>		

## 20. SDG *ad hoc* Team Report

Marc Paganini (ESA) reviewed the development of the CEOS SDG *ad hoc* Team (SDG AHT), which was established at 2016 CEOS Plenary in Brisbane to work until Plenary in Rapid City. There are three current co-leads: CSIRO (Alex Held), ESA (Marc Paganini) and, USGS (Eric Wood).

Marc suggested the SDG AHT take stock of the UN processes in place for SDG implementation and of the existing SDG stakeholders (including GEO). It should focus on the unique role that CEOS should play as a coordination body of space community efforts to support the integration of satellite EO in support to the full realisation of the SDGs. The SDG AHT aligns its engagement in the context of GEO efforts and builds on established relationships CEOS agencies have with the UN agencies (custodians), individual countries (e.g. national statistics), and other SDG stakeholders (e.g. foundations, universities, development banks).

The main initiatives in the group’s implementation plan are:

- a compendium of agencies’ engagement;
- development of a consistent and coherent CEOS engagement strategy on SDGs;
- coordination of CEOS support to GEO-led SDG activities, through the 3 GEO complementary channels (Program Board, EO4SDG and GEO initiatives/flagships);
- assessment of the current and potential contribution of EO to the SDG Targets and Indicators (through the lenses of space-based EO) and identify areas of better EO uptake;
- showcasing the value of EO for achieving the SDG targets and monitoring progress (indicators) though selected pilots that can lead to wide adoption by SDG stakeholders;
- reviewing availability and demonstrate utility of Big Data tools and infrastructures to facilitate uptake of satellite-based EO data by SDG stakeholders; and,

- promotion of the value EO for SDGs at international, regional and national levels - including an Earth Observation Handbook on SDGs (for the UNSC meeting in March and High Level Political Forum in July, amongst others).

Before Plenary the team will:

- streamline and simplify the survey on the CEOS agencies' engagement to collect more responses, and prepare a first Compendium on CEOS engagement on SDGs;
- compile the content (first draft) of the CEOS Handbook for SDGs;
- develop an Implementation plan with key activities, for endorsement at the Plenary (to be shared with CEOS Principals prior to submission to Plenary); and,
- prepare the CEOS/GEO side-meeting at the GEO XIV plenaries next October, this should be a key side meeting in setting directions.

The team will seek renewal at Plenary for its mandate for a further year.

A brief discussion followed:

- Ivan Petiteville (ESA) and Steve Volz (NOAA) congratulated the team on the significant progress of the last year. Steve suggested we consider how best to sustain the effort within the CEOS structure.
- John Remedios (UKSA) reported that the UK National Statistical Office suggested the various National Statistical Organisations (NSOs) seem to be 'dividing up the indicators' but it's not clear what is meant by this. Marc noted that EUROSTAT decided not to report on all indicators, and this is also true for some countries. Stephen Briggs (ESA) suggested that it would be helpful to get insights on national processes.
- Mark Dowell (COM) asked whether it would be interesting to look at which approaches have been most successful, and noted that where relationships have been built with the custodian agencies (e.g. 15.3.1) have been most successful. Marc noted that there is no singular ideal approach, but cases where existing relationships have been in place have worked very well.
- Eric Wood (USGS) noted that we need to convince NSOs via examples that CEOS is 'an asset' to this process.
- Adam Lewis (GA) noted that it would be useful to have some materials (e.g. the compendium) on CEOS activities to share with national governments in discussions about where CEOS support could be promoted. Marc noted that the current materials are more generic, but it was noted that any materials which can help support national dialogues would be welcome.
- Stephen Briggs noted that the SDG AHT should be continued for at least one more year, and suggested that CEOS should consider the possibility of a thematic Working Group (following from Climate and Disasters). This would also be consistent with WGClimate and WGDisasters alignment with two of three GEO's identified priorities.
- Steve Volz agreed, and suggested that the AHT propose a structure. He noted that a joint Working Group may be useful (e.g. with GEO). Stephen Briggs noted that the GEO group is working well on process, tactics, and engagement, where the CEOS group is more focused on content, and so for the moment he suggested keeping them separate. The deliverables and output of any new Working Group should be clearly articulated, and any proposal should address the interface to the GEO group.

- Jonathon Ross (GA/CEO) noted that there may not be sufficient time before Plenary for a formal proposal (per process), but the overall push should be in this direction, and the one-year extension of the AHT should allow sufficient time to consider.
- Mark Dowell (COM) noted that the SDG activity could be as cross-cutting as climate, and similar to the CEOS Carbon Strategy, the activities and competencies of the other CEOS entities should be mapped by the SDG AHT (or future Working Group).

SITTWS-2017-20	CEOS agencies	CEOS agencies to identify SDG points of contact within their agencies	October 2017
	<i>Rationale: An agency point of contact for SDG matters will help with coordination.</i>		
SITTWS-2017-21	AHT-SDGs	Ad hoc Team on SDGs to explore, in consultation with the CEO and CEOS SEC, and in accordance with the CEOS process documents, a path for future evolution of the <i>ad hoc</i> team	SIT-33
	<i>Rationale: The SDGs, alongside Climate and Disasters, are a GEO outreach priority and a standing CEOS response capability may make sense.</i>		

**CEOS-WP:** Section 3.9, Obj/Dev: SDG-1

## 21. Discussion on GEO/CEOS Engagement with International Financing Institutions (IFI) Engagement

Stephen Briggs (ESA) reviewed the background of this activity, noting that it maps to one of the SIT Chair Themes.

*Maintain and improve effectiveness of our strategic partnerships, including with UN agencies, Development Banks, international programmes and agencies; the effective functioning of GEO, and CEOS within it, is a high priority*

Stephen noted that GEO has recognised IFIs as a critical partner, with special panel at upcoming GEO Plenary to discuss, and there is a need to ensure coherent approach between CEOS and GEO in dealing with IFIs. IFIs and National Development Agencies support majority of geospatial activities in developing countries, and so support via these groups will be a key implementation mechanism. He summarised objectives of the IFI session held on Monday, which included: understand the opportunity from the perspective of the IFIs and from the perspective of CEOS and CEOS agencies, considering the approach and process by which the activity could be taken forward, review the draft white paper prepared, and the recommendations for CEOS Plenary (via SIT TW).

The main immediate activity for CEOS agency collaboration was agreed to be the development of a coherent, consistent, and compelling set of materials to promote the ‘mainstreaming’ of EO for Overseas Development Aid (ODA). It was agreed that CEOS needs to address the Banks at three separate levels: improving ongoing implementation; defining improved new implementation; and new strategic policy opportunities afforded by EO information. The overall intention is for CEOS and its agencies to help build the case for EO at the policy level to maximise the societal value of EO by reaching new domains, and making information and tools available to support IFI policies. It was noted that donor countries are the core funders - either bilaterally or via the IFIs they support - and are the ultimate customers. Next steps proposed are:

- a Statement (one page) of the CEOS commitment to support the expanded use of EO in ODA, highlighting the role and benefits that EO can deliver; and
- a supporting document (10-12 pages) consisting of key summary information (based on the White Paper, 3-4 pages) to substantiate the Statement, followed by examples (8-10 pages) that illustrate the benefits and use of EO drawn from across the CEOS agencies.

CEOS Plenary will be asked to endorse the Statement on EO and ODA. The hope is to engage at the highest levels of IFIs using materials, including making the most of GEO Plenary opportunity including the panel discussion as well as the opportunity of being in Washington D.C., where many of the IFIs have a significant presence.

Stephen Coulson (ESA) added that the whole development aid sector presents a real opportunity to sustainably integrate environmental information from satellites. The projects are largely taking place in developing countries, where the access to up to date environmental information is generally poor. The benefits are very real, and while most agencies have been working at project level, the real benefits will be at policy level, and senior level engagement at the Banks is one of the motivations to bring this to CEOS now. The project work over the past number of years by space agencies have helped to raise awareness, and there is currently a lot of interest from the Banks. A joint statement from CEOS issued now could make real impact with these organisations.

A brief discussion followed:

- Stephen Ward (SIT Chair Team) noted that one of the reasons this was pushed was the GFOI example, and its dependence on aid funding. CEOS should insist with GEO that this aid money support should be designed in from the outset on Flagship initiatives.
- Steve Volz (NOAA/SIT Vice Chair) agreed that the timing is good, and noted that a well written one page could have a stronger impact at this early stage of interaction.

Stephen Briggs called for volunteers to work on the proposed materials ahead of Plenary, particularly the one page statement for Plenary.

<b>SITTWS-2017-22</b>	SIT Chair Team	SIT Chair team to coordinate the development of the 1-page statement on EO for ODA for approval at CEOS Plenary.	2017 Plenary for the statement
	<i>Rationale: CEOS agencies keen to better coordinate respective efforts with the IFIs and to address issues raised through the SIT initiative.</i>		
<b>SITTWS-2017-23</b>	SIT Chair Team	SIT Chair team to initiate development of the supporting document of examples.	Seek Plenary action to complete document by end 2017, for approval at SIT-33
	<i>Rationale: CEOS agencies keen to better coordinate respective efforts with the IFIs and to address issues raised through the SIT initiative.</i>		



## 22. Review of 2016-2017 SIT Chair Outcomes

Stephen Briggs (ESA) reviewed the outcomes from the 2016-2017 SIT Chair priorities, including the background from 2015, and the changing context in which the ESA team assumed its term:

- greater public and political awareness of the need for sustainable and better planetary management;
- world population growing to 9Bn by 2050;
- transitional science increasingly driven by societal needs;
- information technology advances unimagined even ten years ago; and,
- easy access to a wide range of freely available data sources, including satellite data.

There is also significant innovation amongst CEOS agencies in systems for the delivery of satellite data more broadly, and more comprehensive, improved data access from the IT revolution. Partnerships have become increasingly valuable for delivery of services, and with the advent of the EU Copernicus programme, and the need to demonstrate programme benefits with continuing resource limitations.

He reviewed specific outcomes for each of the SIT Chair priorities.

### 1. ***Ensure successful advancement of ongoing CEOS commitments and deliverables;***

- **Thematic:** Carbon & CO<sub>2</sub>; Water; Agriculture – GEOGLAM; Climate – GCOS IP, Inventory, SBSTA/UNFCCC; Forests – GFOI; Disasters; and, SDG support; and,
- **In addition:** IFI engagement; Data management – “ARD”; and, Also internal processes via e.g. VCs, WGs.

### 2. ***Ensure full access to, and exploitation of Copernicus Sentinel data;***

- CEOS community consultations on Copernicus issues and uptake at SIT meetings;
- system continues to be more robust with more satellites and improved ground segment;
- Sentinel data have been used in all the major activities undertaken by CEOS and GEO such as GFOI, GEOGLAM, several Disasters activities, etc.; and,
- progress continues.

### 3. ***Further develop the relationships with IPCC and UNFCCC to support observation of climate indicators in the post-COP-21 context;***

- continued reporting to SBSTA;
- new GCOS IP and CEOS Response, including discussion of indicators;
- IPCC Guidelines advocacy; and,
- COM Chair Priority.

### 4. ***Maintain and improve our strategic partnerships (e.g. UN agencies, Development Banks, international programmes and agencies)***

- Development finance survey
- IFI initiative actions and cooperation with GEO
- GEO Plenary IFI Panel
- Development of statement and supporting document
- Starting to work with some of the UN agencies as custodians of specific SDG indicators

Jonathon Ross (GA) noted he has sent info on the four panels at GEO Plenary and agencies are encouraged to reply to him. Stephen Briggs noted with satisfaction the progress through GEO's EO4SDGs.

**5. *Ensure effective functioning of GEO, and CEOS within GEO, with its new strategic goals and a new governance model for the coming decade***

- active CEOS participation in GEO Programme Board (2016, 2017-2019);
- CEOS representative of PB Participating Organisations at GEO Executive Committee (2016, 2017-2019);
- CEOS has been strong supporter (at least) of a more issue-driven approach to GEO implementation, focusing on SDGs, Paris Agenda and Sendai Agreement as first priorities;
- restructuring of GEO infrastructure in response to the above, including creation of Programme Board, reform of ExCom and Plenary; and,
- reformulation of GEO programme to be more responsive, directed and relevant.

Stephen Briggs noted our increasing dependence on the performance of GEO and the need to ensure that this performance remains strong. There are positive signs that the Programme Board is progressing well. André Obrégon (GEO Secretariat) expressed gratitude for the efforts of SIT Chair and CEOS as a whole, and confirmed the awareness of GEO in their role in supporting CEOS. He highlighted opportunities for continued collaboration on climate. Frank Kelly (USGS) added his thanks to ESA and their team for the significant progress these past two years.

**6. *Support initiatives proposed by the CEOS Chairs in 2016 and 2017.***

- **2016 CSIRO:** Future Data Architectures: initial report; continuation into 2017; and, Non-Meteorological Applications: reported at Plenary 2016;
- **2017 USGS:** FDA: sustaining of efforts; and, MRI: new area of effort; and,
- **2018 COM:** Carbon and Climate; and, Data.

## **23. Incoming SIT Chair Priorities**

Steve Volz (NOAA/SIT Vice Chair) acknowledged the progress of the last two years and the careful planning that led to it. He noted that it's been 10 years since an operationally focused agency has been in the SIT Chair role, and this will likely come with a different perspective in pursuit of the goal of making the best use of the activities and capabilities CEOS has. He reviewed the four general priorities for NOAA's tenure:

**1. *Ensure the efficient execution of existing SIT responsibilities as described in the SIT Terms of Reference, including addressing Working Group and Virtual Constellation (VC) continuity, sustainability, and outputs, including:***

- Undertaking gap analyses for each VC, to support ongoing and likely upcoming strategic Agency observatory decisions; the US has an upcoming Decadal Survey process;
- Seeking observations from VCs and WGs on best practices and possible modifications to existing practices; and
- Supporting the activities of the CEOS *ad hoc* Team on Sustainable Development Goals by identifying targets and indicators relevant to each VC.

**2. Enhance the utility of new observations from next generation of geostationary satellites and exploring development of LEO/GEO combination products and data processing capabilities.**

GEO capabilities are advancing quickly and the exploitation of these, including in combination with LEO data, offers great potential. NOAA expects to explore workshops and activities in support.

**3. Improve and clarify CEOS relationships with CGMS, GEO, and to a lesser degree WMO, by identifying coordinated activities and, where appropriate, holistic interaction among CEOS, CGMS, GEO, and WMO, emphasizing the unique values of each.**

- Identify and focus on areas of appropriate and productive collaboration.
- Take stock of trends and future directions so that CEOS can best serve the needs of its Agencies and execute its role most productively alongside CGMS, GEO, and WMO
- Identify appropriate and productive engagement approaches with commercial sector in the process.

**4. Support initiatives undertaken by CEOS Chairs in 2018 and 2019.**

Steve Volz shared some observations from SIT TW on progress being made across CEOS activities.

**Carbon:** GHG Guidebook Development for AC-VC review (Nov '17) and final (Mar '18); and, AC-VC GHG Constellation white paper draft (Dec '17).

**Climate:** Submit a more complete report including recommendations/actions referring to 2.0 of the ECV Inventory Gap Analysis to SIT-33 for endorsement – could this be a foundational task of CEOS?

**Water:** Identify leads and steering committee; proposal for 'Water from Space' workshop.

**Virtual Constellations:** Continuity theme - promote gap analyses for each VC, #2 priority. Look for next generation personnel to support the VCs and WGs – those who can learn on the job and then take on leadership roles 5 years from now.

**Working Groups:** Support multiple Plenary Endorsements.

**Strategic Guidance Documents:** Is it time for a review and update?

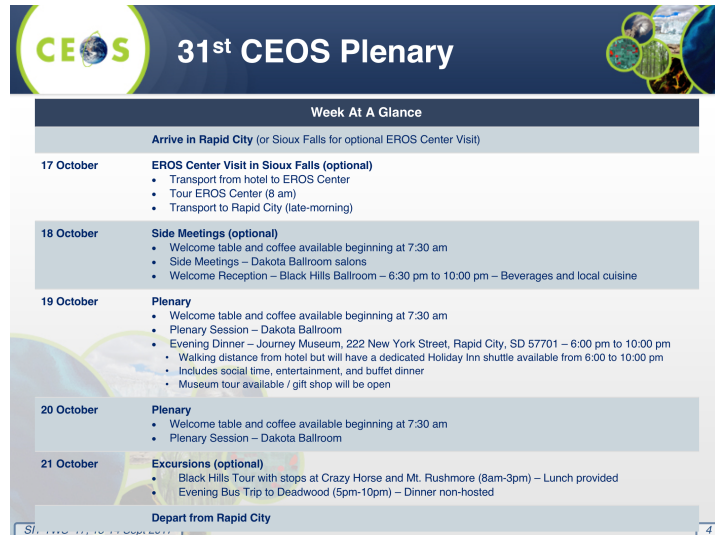
Steve Volz added to the call for a deputy CEO to support the efforts of the incoming CEO. Stephen Briggs (ESA) revisited the SDG Working Group topic and noted that we should continue the discussion as to the optimal future structure within CEOS. He suggested for example trying to coalesce ongoing 'data' activities within existing frameworks like WGISS. Steve Volz suggested that these groups should be allowed to evolve, and try and bring in some new perspectives to the groups.

Andy Mitchell (NASA) noted that WGISS has had discussions on how to interact with the FDA activity moving forward, and they would be open to considering on how to develop an operational research capability.

## **24. Preparations for the 2017 CEOS Plenary**

Frank Kelly (CEOS Chair) referred to the integration of references to the CEOS Work Plan in the Plenary preparations and agenda, noting that this is an effort that has been coordinated with the SIT Chair Team. The objective is to ensure that Plenary preparations address the required background to make effective decisions on topics there. Frank review plans for CEOS Plenary, which will take place

18<sup>th</sup>-20<sup>th</sup> October at the Holiday Inn Rapid City-Rushmore Plaza in Rapid City. Meeting information will be shared online at <http://ceos.org/meetings/31st-ceos-plenary/>. He reviewed the meeting week at a glance.



**31<sup>st</sup> CEOS Plenary**

**Week At A Glance**

**Arrive in Rapid City** (or Sioux Falls for optional EROS Center Visit)

**17 October** **EROS Center Visit in Sioux Falls (optional)**

- Transport from hotel to EROS Center
- Tour EROS Center (8 am)
- Transport to Rapid City (late-morning)

**18 October** **Side Meetings (optional)**

- Welcome table and coffee available beginning at 7:30 am
- Side Meetings – Dakota Ballroom salons
- Welcome Reception – Black Hills Ballroom – 6:30 pm to 10:00 pm – Beverages and local cuisine

**19 October** **Plenary**

- Welcome table and coffee available beginning at 7:30 am
- Plenary Session – Dakota Ballroom
- Evening Dinner – Journey Museum, 222 New York Street, Rapid City, SD 57701 – 6:00 pm to 10:00 pm
- Walking distance from hotel but will have a dedicated Holiday Inn shuttle available from 6:00 to 10:00 pm
- Includes social time, entertainment, and buffet dinner
- Museum tour available / gift shop will be open

**20 October** **Plenary**

- Welcome table and coffee available beginning at 7:30 am
- Plenary Session – Dakota Ballroom

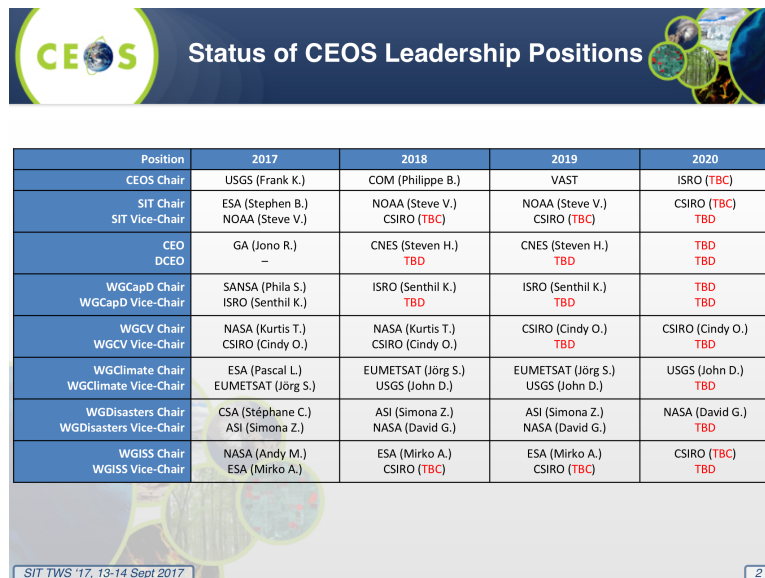
**21 October** **Excursions (optional)**

- Black Hills Tour with stops at Crazy Horse and Mt. Rushmore (8am-3pm) – Lunch provided
- Evening Bus Trip to Deadwood (5pm-10pm) – Dinner non-hosted

**Depart from Rapid City**

## 25. CEOS Organisational Matters

Frank Kelly reviewed the status of CEOS leaderships positions.



Position	2017	2018	2019	2020
<b>CEOS Chair</b>	USGS (Frank K.)	COM (Philippe B.)	VAST	ISRO (TBC)
<b>SIT Chair</b>	ESA (Stephen B.)	NOAA (Steve V.)	NOAA (Steve V.)	CSIRO (TBC)
<b>SIT Vice-Chair</b>	NOAA (Steve V.)	CSIRO (TBC)	CSIRO (TBC)	TBD
<b>CEO</b>	GA (Jono R.)	CNES (Steven H.)	CNES (Steven H.)	TBD
<b>DCEO</b>	-	TBD	TBD	TBD
<b>WGCapD Chair</b>	SANSA (Phila S.)	ISRO (Senthil K.)	ISRO (Senthil K.)	TBD
<b>WGCapD Vice-Chair</b>	ISRO (Senthil K.)	TBD	TBD	TBD
<b>WGCV Chair</b>	NASA (Kurtis T.)	NASA (Kurtis T.)	CSIRO (Cindy O.)	CSIRO (Cindy O.)
<b>WGCV Vice-Chair</b>	CSIRO (Cindy O.)	CSIRO (Cindy O.)	TBD	TBD
<b>WGClimat Chair</b>	ESA (Pascal L.)	EUMETSAT (Jörg S.)	EUMETSAT (Jörg S.)	USGS (John D.)
<b>WGClimat Vice-Chair</b>	EUMETSAT (Jörg S.)	USGS (John D.)	USGS (John D.)	TBD
<b>WGDisasters Chair</b>	CSA (Stéphane C.)	ASI (Simona Z.)	ASI (Simona Z.)	NASA (David G.)
<b>WGDisasters Vice-Chair</b>	ASI (Simona Z.)	NASA (David G.)	NASA (David G.)	TBD
<b>WGISS Chair</b>	NASA (Andy M.)	ESA (Mirko A.)	ESA (Mirko A.)	CSIRO (TBC)
<b>WGISS Vice-Chair</b>	ESA (Mirko A.)	CSIRO (TBC)	CSIRO (TBC)	TBD

A brief discussion followed.

- Stephen Ward (SIT Chair Team) noted that SDCG is also looking for one or more Co-Chairs.
- Jonathon Ross (CEO) noted that the incoming CEO (Steve Hosford) should be referred to as ESA/CNES.

- Mark Dowell (COM) raised the topic of CEOS governing documents and understanding how Chair selection is undertaken, and Frank confirmed that this will be included on the agenda for the Troika meeting at Rapid City.

<b>SITTWS-2017-24</b>	CEOS SEC	To address CEOS Chair continuity and procedures in a near future telecon	CEOS Plenary Troika Meeting
	<i>Rationale: Discussion required on the topic of CEOS governing documents and understanding how Chair selection is undertaken.</i>		

## 26. Review of Actions from the SIT Technical Workshop for the 2017 CEOS Plenary and Closing

Stephen introduced a review of the actions, noting that the draft table will be circulated before being made formal.

With this being the last of four SIT meetings chaired by ESA during their SIT chairmanship, Christine Bognar (NASA) thanked Stephen Briggs and the SIT Chair team for their leadership over their two-year term.

**2017 SIT Technical Workshop Participants**

Organisation	Participant	Organisation	Participant
CSA	Stéphane Chalifoux	JAXA	Misako Kachi
CSA	Paul Briand	JAXA	Akihiko Kuze
CNES	Selma Cherchali	JAXA/RESTEC	Masatoshi Kamei
COM	Mauro Facchini	JAXA/RESTEC	Yukio Haruyama (GTM)
COM	Mark Dowell	NASA	Mike Freilich
COM	Michael Berger	NASA	Christine Bognar
CONAE	Laura Frulla	NASA	Brad Doorn
DLR	Albrecht von Bargaen	NASA	Argyro Kavvada
ESA	Josef Aschbacher	NASA	Andrew Mitchell
ESA	Stephen Briggs	NASA	Kurtis Thome
ESA	Simonetta Cheli	NASA	David Green
ESA	Pascal Lecomte	NASA	Vardis Tsontos
ESA	Ivan Petiteville	NASA	Jorge Vazquez
ESA	Claus Zehner	NASA	Wenyng Su
ESA	Marc Paganini	NASA	Steve Neeck
ESA	Jean-Louis Fellous	NASA/SEO	Brian Killough
ESA	Mirko Albani	NASA/SEO	Kim Holloway
ESA	Carmen Comparetto	NOAA	Steve Volz
ESA	Ben Veihelmann	NOAA	Kerry Sawyer
ESA/CNES/Incoming CEO	Steven Hosford	NOAA	Ken Casey
ESA	Stephen Ward	NOAA	Paul Chang
ESA	George Dyke	NOAA	Charles Wooldridge
EUMETSAT	Alain Ratier	NOAA	Michael Pavolonis
EUMETSAT	Paul Counet	NOAA	Jeff Privette
EUMETSAT	Robert Husband	UKSA/NCEO	John Remedios
EUMETSAT	Jörg Schulz	UKSA	Chris McQuire
EUMETSAT	Anne O'Carroll	USGS	Frank Kelly
GCOS	Simon Eggleston	USGS	Steven Labahn
GEO Secretariat	André Oubégon	USGS	Eric Wood
GEO Secretariat	Akiko Noda (GTM)	USGS	Eugene Fosnight
GA	Adam Lewis	VNSC	Pham Anh Tuan (GTM)
GA/CEO	Jonathon Ross	VNSC	Pham Thi Thanh Nga (GTM)
INPE	Daniel Vila	NASA	Jay Al-Saadi (GTM)
JAXA	Akiko Suzuki		
JAXA	Osamu Ochiai		

(GTM) indicates remote participation via GoToMeeting.



### 2017 SIT Workshop Actions

v1.0

SITTWS-2017-01	CEO	Explore process to support formal traceable citation of CEOS specifications (e.g. for ARD), including reference to Digital Object Identifier (DOI) standard where applicable.	CEOS Plenary
SITTWS-2017-02	CEOS Principals	Contact CEOS Lead for GFOI with offers to provide candidates for SDCG Co-Chair alongside ESA, and with suitable support capacity	ASAP
<i>Rationale: Effective leadership and SEC capacity for SDCG is vital for continued effectiveness of the CEOS contribution to GFOI as it enters Phase 2. Integration of the SDCG Co-Chair and secretariat support may need to be considered.</i>			
SITTWS-2017-03	SDCG EXEC	Liaise with CEOS Chair and CEOS SEC on the way forward for external promotion (including with GEO) of the GFOI Global Baseline coverage achievement in 2017	CEOS Plenary Press release already issued
<i>Rationale: To promote the space agency success in providing satellite data coverage to support any country wishing to monitor their forests using IPCC-compliant GFOI methods and guidance (MGD).</i>			
SITTWS-2017-04	AC-VC	Invited to input ideas from its White Paper that could be followed up by CEOS Chair in 2018	CEOS Plenary
<i>Rationale: COM is willing to advance activities identified as necessary by AC-VC during the 2018 CEOS Chair year.</i>			
SITTWS-2017-05	AC-VC	Provide draft White Paper to IPCC Review process	January 2018
<i>Rationale: The 1<sup>st</sup> Draft Review period for the updated IPCC Guidelines is a critical opportunity for advocacy of inclusion of space data and its role.</i>			
SITTWS-2017-06	CEOS agencies	Encouraged to actively engage, individually and directly, with the IPCC review process and to advocate for the role of space observations.	January 2018
<i>Rationale: The 1<sup>st</sup> Draft Review period for the updated IPCC Guidelines is a critical opportunity for advocacy of inclusion of space data and its role.</i>			
SITTWS-2017-07	JAXA & CEOS Chair	JAXA will inform CEOS members of the IPCC 1st order draft when available (expected late Nov 2017). CEOS Chair will coordinate development of consolidated CEOS agency comments and their input to IPCC during the review window	November 2017 – January 2018
<i>Rationale: CEOS has agreed to engage in the IPCC Guidance update review process.</i>			
SITTWS-2017-08	CEOS agencies	Provide comments on the AC-VC white paper	28 February 2018
<i>Rationale: The AC-VC white paper is an important part of the incoming CEOS Chair Carbon actions and of the CEOS engagement in the IPCC Guidance update.</i>			
SITTWS-	JAXA and	JAXA to provide a draft of the NIES GHG	Late September

2017-09	AC-VC	Guidebook and AC-VC will lead CEOS review and feedback (by end Nov)	2017
	<i>Rationale: AC-VC is best qualified to review the input to IPCC.</i>		
SITTWS-2017-10	CEOS Chair & agencies	Coordinate review by CEOS and CGMS of the Space Agency Response to the GCOS IP (to be presented to SBSTA) with support from WGClimate	From 2 October (Two-week window)
	<i>Rationale: CEOS has committed to maintaining an active response to the GCOS IP as it evolves as the guiding light for its climate observation coordination.</i>		
SITTWS-2017-11	CEOS agencies	CEOS agencies to inform CEO of any plans for side events at COP-23 and for representation at COP-23 - especially at working groups such as RSO	ASAP
	<i>Rationale: Knowing attendance and plans for COP-23 will help optimise engagement by CEOS</i>		
SITTWS-2017-12	CEO, M Dowell, P Lecomte	To draft CEOS speaking points for participation in COP-23	CEOS Plenary
	<i>Rationale: In order to ensure CEOS activities and priorities are represented (to the extent possible) by CEOS agencies at COP-23, a set of talking should be prepared.</i>		
SITTWS-2017-13	CEOS Chair	CEOS Chair to task a small committee to prepare a water coordination planning workshop and to develop a short document defining the details (date, location, objectives)	To Be Presented for Endorsement at CEOS Plenary
	<i>Rationale: A dedicated workshop in 2018 with the goal for CEOS to understand how best its observations may be organized in order optimally to serve the various water community initiatives, and to encourage a coherent response from among them. The focus should be on freshwater, and is not intended to address the whole of oceanography.</i>		
SITTWS-2017-14	VC Leads & LSI-VC	LSI-VC to provide VC's with a package for review and feedback on the CARD4L framework - to identify any components that would be of wider value.	CEOS Plenary
	<i>Rationale: Broad consultation is needed to ensure CARD4L is fit for purpose.</i>		
SITTWS-2017-15	CEOS SEC and AC-VC	CEOS SEC will liaise with AC-VC and use regional SEC contacts to engage appropriate agencies in Republic of Korea and China to facilitate open sharing of satellite data between all partner space agencies	December 2017
	<i>Rationale: This data is important for realisation of the AQ Constellation objectives. Contacts with CMA may be helpful.</i>		
SITTWS-2017-16	SIT Chair	SIT Chair to confirm with CNES that the vacancy for OST-VC Co-Chair is filled prior to SIT-33	December 2017
	<i>Rationale: OST-VC leadership and reporting to CEOS has been disrupted for some time and needs a resolution. EUMETSAT has nominated a Co-Chair (Remko Scharroo).</i>		

SITTWS-2017-17	AC-VC and CEOS agencies	The AC-VC to produce a position paper on unmet Air Quality measurement goals. CEOS agencies to respond with strategies to meet these remaining AQ goals, possibly including innovative funding and partnership approaches to build capacity in the developing world	SIT-33
	<i>Rationale: While the emergent AQ Constellation is a success story, two measurement goals remain unmet: extending hourly AQ observations to the rest of the world and providing hourly CO vertical profile measurements with near-surface sensitivity.</i>		
SITTWS-2017-18	AC-VC and CEOS agencies	The AC-VC to produce a position paper on OSSE capabilities that could efficiently enable joint AQ/GHG satellite constellation studies. CEOS agencies to coordinate existing AQ and GHG OSSE capabilities that could be used to fulfill this goal.	SIT-33
	<i>Rationale: International objectives for both AQ and GHG observations could be achieved more effectively through coordinated planning, and agencies should be encouraged to coordinate existing AQ and GHG Observing System Simulation Experiment (OSSE) capabilities to efficiently enable joint AQ/GHG satellite constellation studies.</i>		
SITTWS-2017-19	CEOS agencies	CEOS agencies to support continuity and redundancy of PMW for SST via the upcoming PMW workshop (April 2018, USA TBC)	April 2018
	<i>Rationale: The SST-VC continues to stress the need for passive microwave (PMW) based SST observations, highlighting the importance of PMW SST observations in the ~7 GHz band, especially in high latitudes, regions of persistent cloudiness, and aerosol-impacted areas.</i>		
SITTWS-2017-20	CEOS agencies	Interested CEOS agencies to confirm representatives to the <i>ad hoc</i> Team for the SDGs	October 2017
	<i>Rationale: The SDG ad hoc Team Co-Chairs need to know the Point of Contact within each CEOS Agency.</i>		
SITTWS-2017-21	AHT-SDGs	<i>Ad hoc</i> Team on SDGs to explore, in consultation with the CEO and CEOS SEC, and in accordance with the CEOS process documents, a path for future evolution of the <i>ad hoc</i> team	SIT-33
	<i>Rationale: The SDGs, alongside Climate and Disasters, are a GEO outreach priority and a standing CEOS response capability may make sense.</i>		
SITTWS-2017-22	SIT Chair Team	SIT Chair team to coordinate the development of the 1-page statement on EO for ODA for approval at CEOS Plenary.	2017 Plenary for the statement
	<i>Rationale: CEOS agencies keen to better coordinate respective efforts with the IFIs and to address issues raised through the SIT initiative.</i>		
SITTWS-2017-23	SIT Chair Team	SIT Chair team to initiate development of the supporting document of examples.	Seek Plenary action to complete document by end

			2017, for approval at SIT-33
	<i>Rationale: CEOS agencies keen to better coordinate respective efforts with the IFIs and to address issues raised through the SIT initiative.</i>		
SITTWS-2017-24	CEOS SEC	To address CEOS Chair continuity and procedures in a near future telecon	CEOS Plenary Troika Meeting
	<i>Rationale: Discussion required on the topic of CEOS governing documents and understanding how Chair selection is undertaken.</i>		