

## MINUTES OF CEOS SIT-38 – 29-30 March 2023

### Executive Summary

1. Good progress was noted on the **2022-2023 SIT Chair priorities** of support to **Societal Challenges** and the **Global Agendas**, defining actions to foster partnerships with the **New Space** sector, and fostering development and use of innovative digital services (e.g., EO data access, data processing).
2. Continued support for engagement with the **Global Stocktake** via the **GHG Task Team** and the **AFOLU Roadmap** was confirmed.
3. Follow-up actions for OCR-VC and SIT Chair to scope resources for the development of an **Aquatic Carbon Roadmap Proposal** were agreed. The scope of resources required will be communicated to CEOS Principals.
4. **WGClimate requested** CEOS Agencies to consider nominating additional members for the Working Group.
5. Engagement by CEOS in the **WMO GHG Initiative**, **GEO-TREES**, and **IMEO** was discussed.
6. Plans for the **2023 EO Handbook** (focussing on the Global Stocktake) were reviewed.
7. 2023 Deliverables related to the **SDGs** were reviewed, and feedback is being sought on the governance arrangements for 2024 and beyond in order to understand future capacity.
8. Progress on support to Biodiversity, and in particular the **Ecosystem Extent Task Team (EETT)** was confirmed, and the nominations of two new co-Leads (from CSIRO and USGS) were endorsed.
9. The accomplishments over the five years of the **COVERAGE** initiative were reviewed.
10. The **Ocean Coordination Group** presented its progress and SIT-38 agreed to extend the group's work until the 2023 CEOS Plenary, where a proposed way forward is to be presented (following further review and discussion at the SIT Technical Workshop (October 2023)).
11. Activities related to **New Space** were presented by UKSA, NASA, and JAXA; the New Space Task Team (NSTT) sought feedback on the core questions in **their discussion paper, seeking feedback from CEOS Agencies**.
12. The **Framework for EO Product Quality Assurance** was presented by WGCV as a potential point of interface with industry.
13. An update on the **CEOS Interoperability Framework** was presented, and the deadline for several related actions was extended until the SIT Technical Workshop (October 2023).
14. There was discussion on **CEOS Engagement with Standards Organisations** and it was suggested that this topic could be taken further by the New Space Task Team.
15. WGCapD presented an update on progress towards the **EOTEC DevNet Sustainability Plan**. The Working Group is also inviting nominations for WGCapD Vice Chair in time for endorsement at the 2023 CEOS Plenary.
16. Potential gaps impacting **precipitation observation and product continuity** were presented by the Precipitation Virtual Constellation, and may warrant further follow-up at the SIT Technical Workshop (October 2023).
17. A new **GEOGLAM and Rapid Response for Food Security** activity was presented, and CEOS Agencies were invited to consider engagement and contributing to its establishment.
18. Updates were presented on workshops hosted by CEOS Chair, GISTDA, on **Global AFOLU Datasets** and **'Shaping the New Space Economy'**.
19. Updates from **GEO Secretariat** in relation to the Post-2025 Strategy and CEOS-related activities were presented. CEOS is awaiting the appointment by the GEO of a new GEO liaison to the CEOS Secretariat. The CEOS Executive Officer has engaged GEO on behalf of the CEOS as the remote sensing arm of GEO.
20. The portfolio of support offered by the **CEOS Systems Engineering Office** was reviewed.
21. To support the amplification of international awareness of CEOS on social media, CEOS Agencies were invited to identify a point of contact for the SEO to contact. Potential updates to the **CEOS Communications Strategy** were also presented.

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## Wednesday March 29<sup>th</sup>

### Session 1: Welcome and Opening Session

#### 1.1: Welcome and Opening Remarks

Presenters: Simonetta Cheli (ESA, SIT Chair) and Ivan Petiteville (ESA, SIT Chair Team) [[presentation](#)]

Simonetta Cheli (ESA, SIT Chair) welcomed participants to ESRIN, noting this is the first in-person SIT meeting since 2019. She thanked the CSIRO and Geoscience Australia 2020-2021 SIT Chair Team for ensuring continuity while in-person meetings were not possible.

Main points:

- There has been good progress on all 2022-2023 SIT Chair priorities, including support to Societal Challenges and the Global Agendas, creating new opportunities via GEO and other key stakeholders, defining actions to foster partnership with the New Space sector, and fostering development and use of innovative digital services (e.g., data access, data processing). The good progress on the ARD and biodiversity topics was also noted.
- Simonetta noted the recommendations in PM2.5 the white paper developed by the Atmospheric Composition Virtual Constellation (AC-VC) and endorsed at CEOS Plenary 2022: “Monitoring Surface PM2.5: An International Constellation Approach to Enhancing the Role of Satellite Observations”.
- UNFCCC Global Stocktake contributions from CEOS are progressing well, and we will hear various updates during SIT-38. Simonetta noted ESA’s CO2M mission and its future contributions to the Global Stocktake (GST).
- *A tour de table* of introductions by CEOS Agency Principal followed.

#### 1.2: CEOS 2023-2025 Work Plan

Presenter: Marie-Claire Greening (CEOS Executive Officer) [[presentation](#)]

Main points:

- The key governing documents that primarily guide the work of CEOS are the [CEOS Terms of Reference](#), the [CEOS Strategic Guidance document](#), the [CEOS Governance and Processes](#) document, and the [CEOS Work Plan](#).
- CEOS Agencies virtually endorsed the [CEOS 2023-2025 Work Plan](#) prior to SIT-38. In recent years, there has been a marked increase in crosscutting activities that engage multiple CEOS entities, reflecting the growing complexity of the endeavors CEOS is undertaking.
- The CEOS Executive Officer is the custodian of all CEOS Governing Documents, including the annual update of the Three-Year CEOS Work Plan and the definition and monitoring of the deliverables it informs. 79 CEOS deliverables are ongoing and have been carried over from the CEOS 2022-2024 Work Plan; 53 new deliverables have been defined for the CEOS 2023-2025 Work Plan. CEOS uses an online tracking tool to lay out, report on, and track CEOS deliverables.

Main discussion points:

- Pakorn Apaphant (GISTDA, CEOS Chair) thanked Marie-Claire Greening (CEOS Executive Officer) for leading the development of the CEOS 2023-2025 Work Plan and thanked the CEOS community for providing inputs.

### Session 2: Carbon and Climate

#### 2.1: Session Introduction

Presenters: Stephen Briggs (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- “Carbon and Climate” is one of the main themes and priorities of the SIT Chair Team, which brings together a number of relevant activities across the CEOS Work Plan.
- Principal internal dependencies include WGClimate, OCR-VC, AC-VC, WGDisasters, WGCapD, GHG and AFOLU Roadmap Teams and external dependencies include the UNFCCC and the Global Stocktake process, WMO, GCOS, GEO, and IMEO.
- Decisions during this session include if and how we progress toward the Aquatic Carbon Roadmap; what data support can be provided to IMEO; the CEOS connection to the WMO Greenhouse Gas initiative. There is no substantial change in the level of support requested of CEOS Principals, but additional contributions are welcomed.

## 2.2: Update on the CEOS Strategy for the Global Stocktake

Presenters: Stephen Briggs (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- The CEOS Strategy for the UNFCCC Global Stocktake (GST) brings together work from across a number of CEOS entities. The [GST Strategy Document V3.1](#) was approved at the 2021 CEOS Plenary and contains nine recommendations for specific actions by CEOS Agencies and entities to support the GST.
- Actions derived from the recommendations are included in the CEOS Three-Year Work Plan and are complementary to those already carried out by CEOS Working Groups, Virtual Constellations, and ad hoc Teams (WGs, VCs, AHTs, aka CEOS Working Teams) in support of the GST. Ongoing work contributes significantly in key areas such as Adaptation (Article 7 of the Paris Agreement).
- The nine recommendations of the GST Strategy were reviewed; more detail can be found in the [presentation](#).

Main discussion points:

- Stephen Volz (NOAA) asked about the “*National Inventory User Engagement*” paper, and whether there are any apparent reasons for the decline of satellite data. Stephen Briggs (ESA, SIT Chair Team) noted there are lots of technical reasons, but he assumes the reasons are political as well. There has been a decline in wall-to-wall mapping uptake, with sampling being used more frequently. Wall-to-wall mapping is more traceable, repeatable, and addresses leakage issues which are challenging to address using statistical methods. Historically, statistical methods have been more typically used, and so there is some inertia in this direction.
- Mark Dowell (EC) indicated it is important to note that this particular paper is focused on the Agriculture, Forestry, and Other Land Use (AFOLU) sector, and doesn’t specifically look at atmospheric GHG composition.
- From the perspective of AFOLU and satellite data providers, there is a need to continue to make the case for the role of satellites, making data and datasets available, and working with the IPCC and its guidelines. The current process is quite conservative, with guidelines in some cases 10 years behind the current state of the art. There is also a need to address all levels of technical proficiency of countries with the available methodologies.
- Mark Dowell (EC) noted that they are seeing more requests for support from EO on loss and damage coming from two places: development programs at national or regional level to prioritise investment (type of impact); and, how we can use EO to evaluate requests for funds (relations between modelling, attribution to climate).
- Alex Held (CSIRO) noted the work by CEOS and the community on GFOI, which included a significant focus on developing good practice guidance. He noted the concerning trend of fewer datasets being available - perhaps this is a result of a blockage in access to data, or related policies.

- Stephen Briggs noted the “*National Inventory User Engagement*” paper mostly discusses policy and infrastructure, rather than technical issues (e.g., quality, quantity).
- Ivan Petiteville (ESA, SIT Chair Team) noted that at the outset of GFOI, there was a reluctance from the Food and Agriculture Organisation (FAO) to join the wall-to-wall approach. He also noted the importance of communication with countries, and that FAO has a much more direct connection with countries.
- Joana Melo (COM) noted that we will explore the map during the AFOLU presentation, and that the study was intended to get a baseline for GST1 in order to measure progress.

### 2.3: Greenhouse Gas (GHG) Roadmap

Presenter: Yasjka Meijer (ESA, WGClimate GHG Task Team Lead) [[presentation](#)]

Main points:

- The GHG Task Team met on the 2 February 2023. One of the main agenda points was to move forward with the review of the CEOS GHG Roadmap, mainly focusing on Annex C (action list). Presentations and minutes are available [here](#). Leads and contributors for each of the actions were identified, and the team will now seek to make the actions more specific and perhaps identify some short-term sub-actions.
- The aim is to complete the update by the end of June 2023.
- Yasjka noted that additional resources are required to complete the update, with support required from the identified leads.
- The next steps include aligning the GHG Task Team activities and converging with the AFOLU Roadmap (covered in CARB-20-01 and GST-2022-06), preparing the community for the data and products from upcoming satellite missions, and ensuring continuity of data and products from existing missions.
- Several challenges were noted that need to be addressed for the GST product. However, it is also important to note the substantial interest from the public and policymakers in the products. As noted at the WMO Workshop and in the press release on these products, there is a clear need for this information with over 50 countries not reporting emissions in the last decade. These lessons learned provide the context and motivation to advance and improve upon these products.
- The GHG Task Team is responding to three actions from the GCOS Implementation Plan: B3.1, F2.2, F5.
- The GHG Task Team aims to meet again on Monday, 16 October 2023, which will be held jointly with the WGClimate prior to the CEOS SIT Technical Workshop (17-19 October 2023).
- GHG Task Team welcomes the potential WMO initiative aiming to develop a GHG Monitoring Infrastructure. The GHG Task Team role is likely to continue, as the space expertise lies within CEOS and CGMS.
- Yasjka thanked his predecessor, Mark Dowell (COM), for leading the CEOS GHG Task Team for a number of years.

Main discussion points:

- Jörg Schultz (EUMETSAT) expressed support for the new way forward, in particular the return to Annex C. He stressed the need for realistic actions that are commensurate with the resources available. Looking forward to the second GST in 2028, CEOS should ensure that the lessons learned from GST1 are carried forward. This includes more thinking on what is needed from the operational space sector, and future measurements. The CO2M mission will help to guide this thinking. The formulation of requirements for operational missions and services is challenging, as is transparency in these systems.

- For an operational implementation, these are top-down measures, what we really mean is inversion modelling. There are three major lines of research in this area: NIES (with some input to national inventories already), the Copernicus MVS system, and more recently in the US, a paper by Brendan Byrne describing the US approach.
- There is a need for clear communication, in particular around what is currently possible and what will be possible in the future. Messages to delegates at UNFCCC meetings can be mixed from space agencies and commercial entities. Space agencies are talking about anthropogenic aspects, which is a much smaller component and many times more difficult to discern. Commercial data and service providers often have much more 'positive' pitches compared to what is being communicated by space agencies, and this can be confusing for delegates. Also, a difference to keep in mind is the differences between CO<sub>2</sub> and CH<sub>4</sub> measurements and the different scales.
- John Remedios (UKSA) noted that we need to be mindful of the audience in communications, e.g., to national bodies, within our community, etc. The UK has supported work on standards, but consideration of the next steps is key.
- Yaskja Meijer (ESA, WGClimate GHG Task Team Lead) stated the next step will be at the upcoming IGARSS (in early July), where the task team will organise a side event. CEOS Agencies are invited to participate in the discussions.
- Yaskja added via chat: *One additional comment I'd like to flag for your attention, is that I see a growing group of companies promising the world to the oil and gas industry to support them with space observations. There is significant risk that this burns their trust as the story is much more complex than it was sold to them.*
- John added that this is related to the New Space topic. Setting standard practice will certainly be helpful, and the GHG Task Team has taken on this activity.
- Julie Robinson (NASA) noted there is a need to focus on immediate actionable items, rather than operational systems that might be much farther down the road. NASA has been working on an interagency GHG working group along with NOAA and will be putting significant additional resources into that effort. Dr. Argyro Kavvada (NASA) has been announced as the lead for this group. This is expected to have a significant impact on the US policy on GHGs, and influence US work with WMO and other systems around the world. She also stressed the findings from EMIT and the potential for immediate and impactful actions, e.g., ensuring the data is calibrated and actionable.

## 2.4: WMO GHG Initiative Update

Presenter: Lars Peter Riishojgaard (WMO) [[presentation](#)]

Main points:

- Provided a brief overview of the WMO GHG initiative: "Toward top-down, internationally coordinated monitoring of greenhouse gas fluxes to support mitigation action under the Paris Agreement".
- The Paris Agreement aims to reduce anthropogenic GHG emissions, but it does not account for natural GHG fluxes or fully address negative emissions which are problematic.
- Greenhouse gas concentration changes can be monitored via either a bottom-up or top-down approach. Both will be needed in the overall monitoring of GHG.
- All activities under IPCC and the Paris Agreement are based on a bottom-up approach. The bottom-up approach yields precise estimates of anthropogenic emissions, whereas the top-down approach estimates net fluxes rather than emissions.
- Although the top-down technology is mature and used individually by Parties, it has not yet been implemented in the context of the Paris Agreement.

- WMO and its partners are currently engaged in the development of a top-down greenhouse gas monitoring framework, leveraging existing elements and over six decades of experience in weather and climate research.
- The official statement from the January 2023 WMO GHG Symposium states that there is an urgent need to build on [existing, disparate greenhouse gas monitoring efforts] to develop a global, internationally coordinated GHG monitoring framework that will help us accurately quantify greenhouse gas sources and sinks to support the UNFCCC Global Stocktake process. The decision will now go to the 19th World Meteorological Congress, held in May - June 2023, with the goal of achieving an intergovernmental agreement to develop and implement this system.

Main discussion points (via chat only):

- Adán Salazar Garibay (AEM) via chat: *A new atmospheric observatory for satellite validation purposes is being established in Mexico, in a natural reserve located in the Yucatán Peninsula, with operations expected to start in the 2nd half of 2023.*
- Klaus Schmidt (DLR) via chat: *It is not practical to stop commercial promoters over promising, but eventually data quality checks will be needed and important.*
- Stephen Briggs (ESA, SIT Chair Team) via chat: *Commercial CH<sub>4</sub> measurement providers can provide useful information on the specific examples of methane super emitters, but there is often insufficient differentiation between those emitters and global capacity for CH<sub>4</sub> and CO<sub>2</sub> inversions (whether public or private).*

## 2.5: CEOS AFOLU Roadmap

Presenter: Osamu Ochiai (JAXA, LSI-VC Forests & Biomass Team) [[presentation](#)]

Main points:

- In 2020, at the 34th CEOS Plenary, CEOS agreed to develop an AFOLU Roadmap, as an initiative to support UNFCCC Global Stocktake (GST) process, which will consist of a GST every five years. The AFOLU Roadmap Team is co-led by NASA, ESA and JAXA.
- 2021-22 accomplishments include:
  - o The assessment of latest AFOLU products;
  - o Development of the [CEOS GST Portal](#);
  - o Organisation of a joint workshop of CEOS AFOLU and GCOS Terrestrial Observation Panel for Climate (TOPC) ahead of the 2022 SIT Technical Workshop;
  - o Input to the synthesis report on “The Role of Systematic Earth Observations in the Global Stocktake” for UNFCCC;
  - o Biomass harmonisation exercise on ESA/NASA MAAP datasets; and,
  - o Contributions to COP-27 and Earth Information Day in 2022.
- In 2023, the group will focus on the development of the CEOS AFOLU Roadmap document. The document aims to provide a framework for long-term (2035 timeframe) coordination of relevant Earth observation missions, as well as provide an effective means of communicating CEOS Agency upcoming mission plans.
- AFOLU is unique among the sectors considered in this context, since the mitigation potential is derived from both an enhancement of removals of greenhouse gases (GHG), as well as reduction of emissions through management of land and livestock.
- Contributing to the Global Stocktake process requires adherence to the modalities and guidelines of the UNFCCC.



- Planning to deliver the Roadmap by June 2023 ahead of the first GST at COP-28, at the end of this year. To date, the AFOLU Roadmap team has already identified a number of draft recommendations for the final version of the document.
- National user engagement is taking place through Sylvia Wilson and the USGS SilvaCarbon project, with ten countries engaged. CEOS Chair GISTDA, in collaboration with SilvaCarbon, hosted a workshop in Thailand on carbon accounting from space, alongside the workshop on the application of global datasets at a national level.

Ian Jarvis (GEOGLAM) provided an update on the Agriculture sector:

- The ESA WorldCereal project has helped advance the 'A' in AFOLU, building a system that we can continue over time. It has helped inform the development of *in situ* data collection approaches, and developed and tested algorithms. This is just a start, and there is a need to understand continuity for WorldCereal efforts.
- A gap analysis is being conducted, utilising the Essential Agricultural Variables (EAVs), looking at what is needed for long-term UNFCCC reporting (GSTs, NDCs).

Joana Melo (COM) provided an overview of the outcomes of her paper, titled "Satellite-based global maps are rarely used in forest reference levels submitted to the UNFCCC" ([link](#)):

- Highlighted the importance of the AFOLU Roadmap, stressing that if CEOS Agencies want to contribute their data and products, we need to understand the IPCC rules and guidelines used by countries to report. Data needs to be presented in a way that promotes and eases uptake.
- From CEOS missions, there are a number of products available which can be used to estimate fluxes. For example, for activity data, 43% of Low and Lower-Middle income countries use satellite data for this. As previously noted, there is a change from wall-to-wall systems to sampling.
- Emission factor estimates are rarely calculated by countries via satellite data, and to date, there has been negligible use of fire products and biomass maps. These datasets could be useful for QC/verification (indirect use).

Main discussion points:

- Following Ian Jarvis' (GEOGLAM) announcement of his upcoming retirement, Julie Robinson (NASA) thanked Ian for his efforts over the years in driving GEOGLAM, and for his collaboration and positive influence across the community.

## 2.6: Aquatic Carbon Roadmap Proposal

Presenter: Marie-Hélène Rio (ESA, OCR-VC co-Lead) [[presentation](#)]

Main points:

- The global carbon budget is assessed annually to track progress in reducing greenhouse gas emissions. Measuring the global land sink accurately is challenging due to variations in land cover, vegetation, and terrain. However, it can be estimated indirectly through the ocean carbon sink.
- Oceans absorb CO<sub>2</sub> from the atmosphere, reducing its warming impact, but also causing seawater to acidify. Ocean carbon is also a key constraint to the global carbon budget and improving ocean carbon estimates will improve the land carbon budget and global carbon assessment.
- So far, the ocean sink has increased with emissions, but its future response is not known, i.e., can the sink continue to increase, or how will biology change and influence it?

- There are inconsistencies in satellite data usage, uncertainties in understanding ocean carbon fluxes, and a lack of knowledge on blue carbon and land-ocean fluxes, all impacted by climate-related modifications that need further assessment.
- The GHG and AFOLU Roadmaps focus on pragmatic milestones and prototype inventories, while the Aquatic Carbon Roadmap will cover all dimensions of aquatic carbon and aims to support the Global Stocktake process of the Paris Climate Agreement and country-level reporting on CO<sub>2</sub> fluxes and Blue Carbon coastal ecosystems.
- The development of the Aquatic Carbon Roadmap is a very timely, but ambitious, commitment. This would require CEOS to coordinate and collaborate with IOCCG/CEOS OCR-VC, AFOLU Roadmap and the GHG Roadmap, in particular with regard to Blue Carbon ecosystems.
- The development of the Aquatic Carbon Roadmap will require resources from CEOS Agencies.

Main discussion points:

- Stephen Briggs (ESA, SIT Chair Team) noted the request for resources and asked if they can be drawn from what already exists within OCR-VC or IOCCG, or if there is an additional request.
- Marie-Hélène Rio (ESA, OCR-VC co-Lead) clarified that more resources are required. There are activities planned by several agencies, but this is an ambitious Roadmap and requires resources to match that ambition.
- It would be helpful to know the level of additional resources required, and to have a more specific request.

<b>SIT-38-01</b>	OCR-VC to liaise with SIT Chair to provide an assessment of the resources and estimated time horizon needed from the relevant CEOS agencies to undertake development of the Aquatic Carbon Roadmap following the proposal presented at SIT-38 by OCR-VC. SIT Chair will support communication of the request(s) to CEOS Principals.	<b>May 2023</b>
	<i>Rationale: OCR-VC will need additional support to undertake the proposed Aquatic Carbon Roadmap. SIT Chair will help determine whether the necessary support is available from CEOS agencies.</i>	

- Mark Dowell (COM) recalled the discussion approximately 18 months ago when it was felt that Aquatic Carbon would be the third leg of the climate roadmaps. The scope of Aquatic Carbon needs to be broader than the GHG and AFOLU roadmaps. He stressed that we should not lose sight of how this can contribute to the GST process, and OCR-VC should consider the interface with the GHG and AFOLU Roadmaps. This could include a subset of observations required for oceans and it could consider the IDIS (Integrated Data Information System).
- For GHG Watch, Lars Peter Riishojgaard (WMO), has been connected with oceans via GOOS. This is another potential avenue for collaboration on this Roadmap.
- Stephen Volz (NOAA) agreed this is an important topic and concurred with the need for exact requirements for gaps, as well as matching datasets with the AFOLU and GHG Roadmaps, and interoperability. Observational gaps should also consider *in situ* measurement needs.
- Jörg Schultz (EUMETSAT) suggested the AFOLU and GHG Roadmaps should reference the GCOS Implementation Plan (IP), in particular, the state of the art included there. This may trigger a discussion for the next GCOS IP, due in about five years' time.

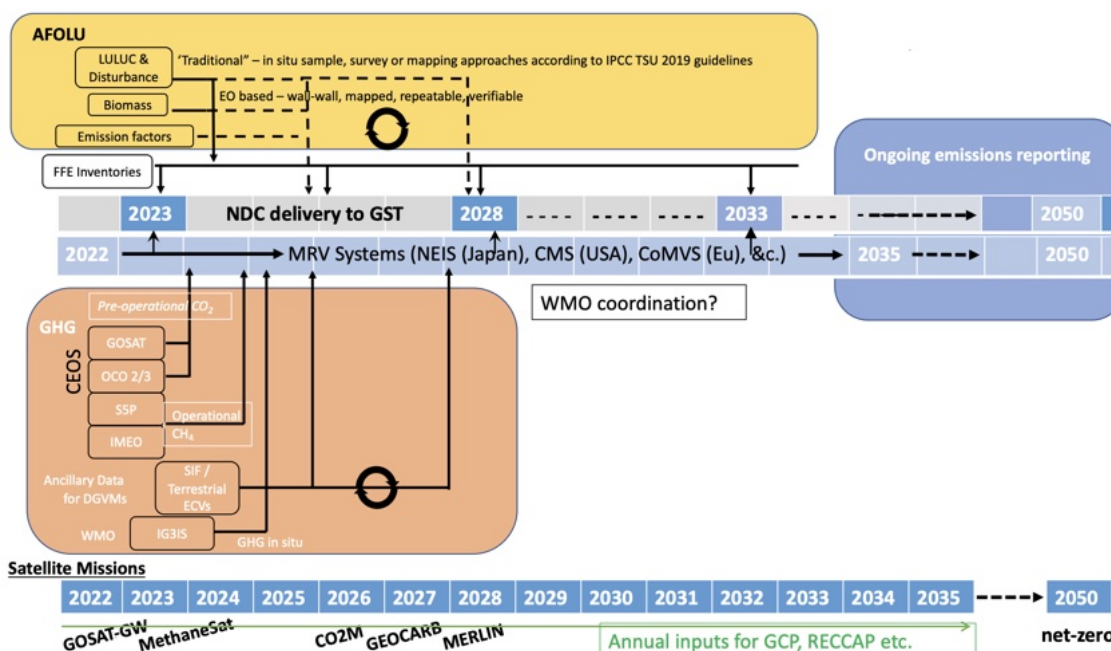
- Christo Peter Whittle (CSIR, SST-VC co-Lead) noted CEOS-COAST may be able to assist in the carbon assessment of AFOLU. He also noted that some commitment exists in other ocean VCs, and this would fall well in the coordinated activity of the ocean VCs and the Ocean Coordination Group.
- For resources, we should differentiate between what is needed to develop the Aquatic Carbon Roadmap, and what is needed to implement the Roadmap.
- Ivan Petiteville (ESA, SIT Chair Team) suggested CEOS could aim to attract more IOCCG people into the activity of the OCR-VC.

### 2.7: AFOLU and GHG roadmaps - comparison of paradigms

Presenter: Stephen Briggs (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- From the IPCC perspective, there are only two sources of emissions: AFOLU and GHG. The context in which the Roadmaps are being developed is shown in the diagram below, which depicts a 'bottom-up' process, and presents significant scaling challenges globally. There is an additional 'bottom-up' physics-based process, with both aimed at providing the best possible emissions inventory. The Aquatic Carbon Roadmap can likely add a third model here.



Main discussion points:

- Yasjka Meijer (ESA, WGClimate GHG Task Team Lead) via chat: *Once the Roadmaps have substantially evolved, we will need to work on "towards understanding the greenhouse gas cycle in a changing climate"*.
- Mark Dowell (COM) agreed and noted the opportunities to think of consistency between elements of these two approaches. CEOS should strive for AFOLU reporting to be equivalent to data simulation systems that provide boundary conditions for the MVS. The same could happen for biomass, etc.
- Yasjka noted that the GST is taken from the Paris Agreement, which focuses on avoiding emissions. Should we also look at the already changing climate, and address the need to understand the carbon cycle within this context? This is not captured by the IPCC and combining the Roadmaps could give a better understanding.

- There are two different aspects to consider: trying to provide information for carbon accounting and inventories and, the better understanding the underlying situation and what is happening with the Earth system. Both aspects need to be supported.
- John Remedios (UKSA) asked about consistency in the AFOLU Roadmap, noting the focus on biomass in countries could cause the emphasis of the global maps of biomass to be lost. In terms of ensuring consistency and understanding, we still need that global perspective.
- Osamu Ochiai (JAXA, LSI-VC Forests & Biomass Team) suggested the possibility of addressing both, facilitating the input of global maps as input to national MRV systems.

**2.8: WGClimate Activities**

Presenter: Jeff Privette (NOAA, WGClimate) [remotely] [[presentation](#)]

Main points:

- WGClimate-18 was hosted by JAXA in Tokyo from 28 February 2023 - 2 March 2023. The meeting discussed the CEOS 2023-2025 Work Plan and top priorities including the space agency response to the GCOS Implementation Plan (GCOS IP), releasing the Gap Analysis Report (v3/4.1), updating the Coordinated Action Plan, restructuring the ECV Inventory, preparing a statement for UNFCCC COP-28, and contributing to Earth Information Day.
- The response to the 2016 GCOS IP adopted a new approach to achieve a more balanced workload and timely response. Expert teams now work with GCOS Panel experts to develop responses, and leads have been identified for each relevant GCOS Action. A virtual kick-off event was held in mid-April 2022 to initiate routine coordination with GCOS leadership.
- A critical review of the ECV Inventory was conducted which found that the inventory serves many roles and provides a searchable library for users, but the gap analyses require a lot of effort from a limited pool of experts.
- The path forward includes releasing Version 5 of the ECV Inventory in 2023 by adding about 45 already submitted records, revamping ECV processes and infrastructure, and developing a simpler access and discoverability-focused public-facing front end.
- WGClimate had a fruitful discussion with Dr. Joanna Post from UNFCCC/SBSTA in October 2022. The role of WGClimate will be to advocate Agencies’ observation needs and findings, submit an annual statement to SBSTA, and provide Earth Information Day materials.
- Joanna Post has now moved to a new position. WGClimate will coordinate messaging with the new lead at UNFCCC once the individual is seated.
- GEO is seeking collaboration with WGClimate on various events and the Space for Climate Observatory (SCO) may also partner with WGClimate on Climate Data Record (CDR) Use Cases.
- WGClimate is currently unable to support the New Space Task Team, CEOS ARD Oversight Group, and the Oceans Coordination Group due to lack of resources. CEOS Agencies were asked to consider naming a representative to WGClimate if none currently exists for their Agency, and to offer additional support to WGClimate tasks such as the GCOS Implementation Plan Response and ECV Inventory Gap Analysis.

<b>SIT-38-02</b>	CEOS Principals whose agency is not already contributing to the work of the Joint CEOS-CGMS WGClimate are asked to consider nominating an agency representative.	<b>May 2023</b>
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*Rationale: The WGClimate has made known that it needs broader representation and support from CEOS Agencies to accomplish the WG objectives.*

## **2.9: Update on CEOS Support to IMEO (International Methane Emissions Observatory of the United Nations Environment Programme)**

Presenter: Stephen Ward (SIT Chair Team) [[presentation](#)]

Main points:

- Eliminating the top 10% of stray methane emissions from various identified sources would make a significant contribution to meeting the temperature rise ambitions. Space-based EO has a key role to play in this area, and it is one in which EO can make a big contribution. Over the past couple of years, the ESA SIT Chair team has been engaging IMEO in CEOS discussions, seeking to increase the amount and types of data available to IMEO and the Methane Alert Response System (MARS).
- The broader focus of IMEO is to catalyse reductions of methane emissions using transparent, data-driven approaches.
- The first phase of MARS will use satellite remote sensing for the detection and attribution of methane emissions (above current detection thresholds); it will also include notification and mitigation-tracking workflows.
- CEOS Agencies are supporting this activity through several threads with IMEO, including CSA, ESA/COM and DLR. A potential joint CEOS-IMEO campaign is under consideration.

Main discussion points:

- Osamu Ochai (JAXA) noted that JAXA has started a bilateral dialogue with IMEO on how GOSAT-1 and GOSAT-2 can contribute to the activity. GOSAT-GW is a Japanese Ministry of Environment mission, so how it might also contribute is yet to be explored.
- Mark Dowell (COM) noted the EU methane strategy was published about a year ago, and that a stricter piece of legislation is in draft at the moment which makes specific reference to EO data and how to use it.
- Stephen Ward (SIT Chair Team) referenced a recent article in The Guardian on this issue ([recent guardian article](#)).

## **2.10: GEO-TREES**

Presenter: Stephen Ward (SIT Chair Team) for Klaus Scipal (ESA) [[presentation](#)]

Main points:

- GEO-TREES aims to secure 50 Million Euros in funding over five years, but currently only 1% of the funds are committed, with TotalEnergies One Tech contracting for two sites to increase the commitment to 2%. Pitches to larger funds (e.g., the Bezos Earth Fund) are in preparation.
- CEOS can help by validating EO products and encouraging national champions to demonstrate their commitment to EO product validation.

Main discussion points:

- Ivan Petiteville (ESA, SIT Chair Team) noted the opportunity for CEOS Agencies to contribute, and if Agencies can support the project via sites they operate, this would be very useful. This could also come via relevant existing activities in their region.
- Jeff Privette (NOAA, WGClimate) via chat: *Are LPV Land Validation Test (Validation) Sites part of the biomass network?*

- Klaus Scipal (ESA) via chat: *Some of the TREES sites are also LPV sites (in Australia for example the TERN sites), but not in general. TREES sites have been selected based on existing forest census observations and representativity. The site selection can be modified if justified.*

<b>SIT-38-03</b>	CEOS Agencies to consider whether they might support GEO-TREES through the sponsorship of one or more validation sites. Interested Agencies are asked to follow up to <a href="#">Klaus Scipal</a> of ESA.	<b>Plenary 23</b>
	<i>Rationale: GEO-TREES has sponsorship for only a handful of the targeted 100 sites and seeks to add more sites to the network in support of impactful biomass data from CEOS missions</i>	

### 2.11: EO Handbook Progress

Presenter: Stephen Ward (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- The CEOS Earth Observation Handbook, produced since 1992 for major events related to CEOS priorities, promotes the role and importance of satellite EO for thematic areas to policy makers, politicians, and key users. The Handbook is powered by the CEOS MIM Database and is a contribution from ESA to CEOS as a permanent Secretariat member.
- The 2023 edition of the Earth Observation Handbook is timed for the first Global Stocktake of the UNFCCC Paris Agreement and seeks to promote the importance of satellite Earth observations for all stakeholders.
- It will be available in PDF/e-book and dynamic website formats, with a foreword from UNFCCC SEC Executive Secretary, Simon Stiell, alongside CEOS SIT Chair Simonetta Cheli.
- GEO is also working on an EO Task Force for COP 28 with UAESA, with support from UNFCCC SEC which will promote the EO Handbook via special events around COP-28 and Earth Information Day.

Main discussion points:

- Pakorn Apaphant (GISTDA, CEOS Chair) highlighted the importance of this publication, and added that CEOS should ensure it is recognised by governments. Agencies should all promote the publication to their respective government agencies, ensuring policymakers are paying attention to EO.
- Simonetta Cheli (ESA, SIT Chair) encouraged CEOS to promote the EO Handbook through all relevant fora. ESA is considering how to use this for the ESA Summit at the end of the year. CEOS should also ensure the publication is well promoted for COP 28.

### 2.12: Closing Discussion

Main discussion points:

- Stephen Volz (NOAA) noted Jeff Privette's request welcoming support and the nomination of new members from CEOS Agencies for the joint CEOS-CGMS WGClimate, in particular in connection with Oceans.
- Mark Dowell (COM) suggested showcasing the EO Handbook at the GEO Ministerial.
- The AFOLU Roadmap could be promoted at an upcoming high-level event in Brussels being organised within the WRI [Land and Carbon Lab](#), which also coincides with the EU-US bilateral.

## Session 3: Sustainable Development Goals

### 3.1: Session Introduction

Presenter: Marc Paganini (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- SDGs are one of the priorities of the SIT Chair, and at the 2021 CEOS Plenary a new structure for CEOS SDG coordination was agreed. Within this structure, the SIT Chair provides strategic guidance, while the SEO is the implementation lead. This coordination includes individuals from across CEOS as well as external representation from GEO's EO4SDGs project who provide a connection with SDG custodian agencies and other stakeholders.
- The objective of this session is to report on work over the past year, present a work plan for 2023, and provide mid-term perspectives. CEOS should also reflect on the effectiveness of the new structure and take stock of resources to see if they are consistent with the ambitions of the team.
- Feedback on continuity and clarity of the current governance arrangements for 2024 and beyond is being sought, and this will be important in setting the scope of future priorities.
- There is an open question around whether CEOS should seek to undertake activities around additional SDGs or even focus on the Target level (currently focused on specific indicators).

### 3.2: CEOS Support to the SDGs

Presenters: Dave Borges (NASA, CEOS SEO) [[presentation](#)]

Main points:

- The SDG coordination group has been progressing well since its inception at 2021 CEOS Plenary but more engagement is needed across CEOS groups to remain relevant and have the greatest impact.
- The Earth Observation (EO) Support sheets have proven to be a valuable resource for the user community and Custodian Agencies. CEOS plans to keep them updated by undertaking an annual review to ensure that details including current approaches and challenges, data requirements, access and tools, and the publication references remain up-to-date and useful.
- The COAST Bathymetry project has been moved out of CEOS and SDG deliverables and will run through the GEO Blue Planet initiative.
- To ensure efficient functioning during the transition from the ESA SIT Chair to the JAXA SIT Chair for the 2024-2025 SIT Chair term, the team will need to continue to work closely with JAXA (to be represented in this coordination group).
- Improving coordination group awareness of relevant activities across CEOS is important to remain effective. Deliverables should be jointly proposed, leveraging expertise across CEOS. There is ongoing discussion with WGCapD regarding cross-cutting capacity building.
- The SIT Chair and CEO will provide CEOS-wide SDG related updates during monthly Coordination Group meetings.
- The current CEOS expectations for the GEO Secretariat: *“CEOS does not expect to have regular interactions with Custodian Agencies and will rely on GEO to maintain those interactions”*. However, recent changes to the composition of the GEO Secretariat team call into question how this dynamic will work going forward. CEOS has yet to hear from GEO regarding a replacement for Laurent Durieux.

Main discussion points:

- All the activities CEOS supports are channelled through GEO, leveraging their relationship with SDG custodian agencies. Marc Paganini (ESA, SIT Chair Team) noted the UN Convention

to Combat Desertification (UNCCD) presentation at yesterday's side meeting, which included attendance from leadership of the GEO Land Degradation Neutrality (GEO-LDN) initiative.

- Laurent Durieux (GEO) noted that GEO is moving towards much more integration and will likely not seek to renew the SDG Coordinator role in the GEO Secretariat. The responsibility will be distributed across different coordinators in thematic areas. The GEO-CEOS liaison will likely be a partnership coordinator but this person has yet to be identified.
- The changes to the GEO approach and how this relates to the way CEOS is working, warrant a discussion about how CEOS and GEO can work together, and the expectations of both organisations. This is an issue in other areas as well, e.g., the Global Ecosystem Atlas.
- The GEO Wetlands activity provided a nice output at the end of last year, and GEO-LDN has been a success. The sustainability of both needs to be discussed.
- Formalising a link between WGCapD and SDG Coordination Group may be beneficial.
- GEO has a new Urban coordinator, Martyn Clark, who may be a suitable POC for more technical relations with CEOS, in particular SDG 11. Martyn joined the SDG side meeting yesterday and presented a new concept for an incubator regarding urban health.
- CEOS should consider extending a more formal request to GEO for support to the SDG Coordination Group, in particular because Argyro Kavvada (NASA) is moving on to a new role this week.
- Osamu Ochiai (JAXA) noted JAXA is one of the co-leads for EO4SDGs, and that Global Mangrove Watch is their focus.
- Stephen Volz (NOAA) acknowledged the importance of a GEO point of contact for CEOS. He noted GEO is reforming to get ready for post-2025, and that this should include an ongoing dialogue between CEOS and GEO.
- Marie-Claire Greening (CEOS Executive Officer) noted she has contacted Yana Gevorgyan (GEO SEC Director) regarding the identification of a new point of contact but had received no response.
- Julie Robinson (NASA) noted that the SDGs, while important for the world, are very broad. They overlap with other areas across CEOS. She is not sure if adding new Indicators and products fits well under the SEO going forward. This group is quite small and not necessarily suitably resourced to take on new Indicators.
- Ivan Petiteville (ESA, SIT Chair Team) highlighted that the SEO is in charge of coordinating implementation, and called on VC participation for further inputs.
- Marc Paganini (ESA, SIT Chair Team) noted the need to better reflect the representation of different CEOS groups in the SDG coordination group, to leverage existing entities and expertise. It should be very clear what the responsibilities and needs are for the SDG coordination group.

## Session 4: Biodiversity

### 4.1: Session Introduction

Presenters: Marc Paganini (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- Noted the establishment of the Ecosystem Extent Task Team at CEOS Plenary last year. The goal is to analyse the observational capabilities that missions bring to mapping of different biomes. CEOS is uniquely positioned to conduct such an analysis, with high demand in many global policy areas for the monitoring of changes in biome conditions.



- The main issues for Principal discussion in this session are the white paper outline/draft and related resource requirements, and the demonstrator initiative(s) selected by the Ecosystem Extent Task Team. Feedback is sought on the white paper and demonstrators, and the identification of other CEOS activities that could be leveraged to support the selected demonstrators would be helpful.
- There is a need for sustained resources for the Ecosystems Extent Task Team to complete its white paper and develop the proposed demonstrators.
- Noted the retirement of Marie-Josée Bourassa (CSA) at the end of this month and thanked her for contributions to date. The team would like to add additional co-lead(s), and two nominations have been received, from CSIRO and USGS.

#### 4.2: Ecosystems Extent Task Team (EETT)

Presenters: Gary Geller (NASA, EETT co-lead) and Sandra Luque (CNES, EETT co-lead) [[presentation](#)]

Main points:

- The Ecosystems Extent Task Team is developing a white paper that will provide an integrated international perspective on how space-based Earth observations can be used to support ecosystem mapping and monitoring with a focus on ecosystem extent.
- The key challenge to developing the white paper is understanding ecological systems at a global or regional scale which requires the integration of a wide variety of different sources, types of data and interdisciplinary expertise.
- Overall message from the white paper includes:
  - o EO is underutilised for biodiversity applications;
  - o Ecosystem Extent is a key product needed by a wide range of organisations;
  - o Advancing technology and both current and forthcoming missions have the potential to greatly improve existing products;
  - o New missions will greatly extend ecosystem extent mapping and monitoring capabilities; and,
  - o Operational methods and tools to be linked to policies for improvement of public awareness and cost-effective management of biodiversity.
- The objective of the demonstrator is to show the use of EO for ecosystem extent mapping and monitoring. The timing for its delivery is during the final quarter of 2024. The three promising initiatives include Hudson's Bay Lowlands in Canada, Pilliga Forest in Australia, and tropical forests in Costa Rica. These are all existing projects, and CEOS's role includes facilitating data provision.

Main discussion points:

- Alex Held (CSIRO) noted CSIRO is proud and happy to support the nomination of Shaun Levick as co-lead for the Ecosystem Extent Task Team. Shaun comes with a very interesting background and has worked with GEDI and LiDAR data. He has also done work with the Open Data Cube, coding, and linking to ecosystem scientists contributing to GEO BON.
- Tim Newman (USGS) expressed his agency's strong support for the nomination of Roger Sayre (USGS) as a co-lead for this effort.
- Selma Cherchali (CNES) noted the continued support of CNES following the endorsement at CEOS Plenary, and looks forward to seeing the work on the demonstrators.
- Eric Laliberté (CSA) thanked Gary, Sandra, Marie-Josée Bourassa (CSA), and the whole team. This will be the priority of the CSA as 2024 CEOS Chair, concentrating on this one activity and its continuity. He thanked CSIRO and USGS for their nominations. Eric will ensure CSA is represented on the team following the retirement of Marie-Josée.

- Julie Robinson (NASA) congratulated the team, and thanked Marc and Laurent for building the momentum since the SIT Technical Workshop 2022. The division of the work aligns well with the four co-leads, and NASA supports the nominations and this way forward.
- Marc Paganini (ESA, SIT Chair Team) thanked Laurent for his contributions to the team.
- No objections were raised to having four co-leads of the EETT.

#### DECISION 01

Accepted the nominations of two additional co-leads for the Ecosystem Extent Task Team (EETT) from CSIRO (Shaun Levick) and USGS (Roger Sayre) to join Gary Geller (NASA) and Sandra Luque (CNES) as Co-leads.

### 4.3: Biodiversity COP-15 Outcomes

Presenters: Marc Paganini (ESA) [[presentation](#)]

Main points:

- The Kunming-Montreal Global Biodiversity Framework (GBF) with four long-term goals for 2050, and 23 targets for 2023, was adopted at CBD COP-15.
- 32 decisions were adopted at the Conference, including the adoption of the GBF Monitoring Framework (MF). The indicators in the MF will be reviewed until COP-16 and an Ad Hoc Technical Expert Group (AHTEG) will be established.
- A global review of collective progress in GBF implementation will be conducted at COP-17 in 2026 and COP-19 in 2030.
- Regional capacity-building centres will be established, and concepts for a Global Knowledge Support Service for Biodiversity (GKSSB), and a Global Biodiversity Observation System (GBIOS) are under development.
- Earth Observation (EO) is an important source of information for the implementation of the Global Biodiversity Framework and EO has an important role for indicator production for the Monitoring Framework, starting with headline indicators like the extent of natural ecosystems.
- It is crucial for CEOS to engage with existing mechanisms for technical and scientific cooperation and to support the development of capacities in countries for resource mobilisation and capacity building.

Main discussion points:

- Ivan Petiteville (ESA, SIT Chair Team) noted there are plenty of opportunities for CEOS to contribute, and some are well aligned with existing CEOS capabilities and activities. For example, the EETT responds well to the needs of COP-15. For other requirements, CEOS should consider the resources required to achieve the objectives. This could be better connected to efforts such as AFOLU. Overall, this requires more people, and it is not obvious whether CEOS has these resources available.
- Mark Dowell (COM) noted that in due course, these types of assessments may be done by others, for example where some of the headline indicators are similar to GBF indicators. CEOS Agencies could then respond to these assessments.
- Marc Paganini (ESA) commented that CEOS agencies might do their own assessments, and the indicators group will start with a conceptual approach as a pilot that will benefit CEOS.
- Laurent Durieux (GEO) noted we have high level critical decisions to make, including continuity with carbon-related topics, e.g., the Roadmaps. A conservation programme was launched at the One Planet Summit, as funding drives where action happens. In the three demonstrators, we have a good cross section of what is required.

- Sandra Luque (CNES, EETT co-lead) highlighted the important interlinkage between different members of the Ecosystem Extent Task Team. Both Amanda Koltz (NASA) and Sandra are members of the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), which had a workshop last week on the nexus assessments. There is a strong and important interlinkage between IPBES and the GBF highlighting what they can do for one another.
- Sandra was also present at the WGCapD-12/UNSpace meeting, where she presented on behalf of the EETT. As a result of this presentation, one colleague who is a member of GBF is now joining the EETT as an expert. Sandra also noted her membership in a project providing information on biodiversity for Europe. These connections show the EETT is well connected across biodiversity and remote sensing experts.
- Marc Paganini (ESA) recognised that IPBES is similar in structure to IPCC, in that the GBF connects to the countries, and IPBES is focused on assessments.
- Mark Dowell (COM) noted the recent ratification of the High Seas Treaty, which confirms the 30% protected areas decision for the marine environment.

## Session 5: Oceans and Coasts

### 5.1: Session Introduction

Presenters: Marie-Hélène Rio (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- CEOS has many activities related to Oceans and Coasts, including four Virtual Constellations.
- The following agenda items cover some of these activities, including the UN Decade of Ocean Science for Sustainable Development, which is likely to be a major driver of CEOS effort in the future, and the CEOS Ocean Coordination Group, which has been considering how best to structure CEOS' response to the UN Decade and ocean activities in general.

### 5.2: UN Decade of Ocean Science for Sustainable Development

Presenters: Emma Heslop (IOC) [[presentation](#)]

Main points:

- 45 programmes and 214 projects have been endorsed by the UN Decade of Ocean Science for Sustainable Development (known as the UN Ocean Decade).
- The Decade Coordination Offices (DCOs) and Decade Collaborative Centres (DCCs) play an important role in coordinating existing and new Decade actions. Discussions are progressing for DCCs/DCOs in the Arctic, Southern Ocean, Caribbean, and South Pacific.
- The 2024 Ocean Decade Conference will be held in Barcelona, Spain, on 10 - 12 April, 2024.
- To achieve transformation for the Ocean Decade, GOOS has launched three integrated programmes: Co-Design, Coastal Ocean and Capacity Development.
- CoastPredict ensures open and free access to coastal information, with a new modelling approach.
- GlobalCoast is a pilot programme aimed at developing new technologies and services, with public-private partnerships. This could be a good opportunity for co-design and direct integration of remote sensing and *in situ* observations.

Main discussion points:

- Ivan Petiteville (ESA, SIT Chair Team) noted the enormous scale of EO support needs in all fields presented. This is a key driver of the need for CEOS to clearly assess priorities and

organise. It is clear that we won't be able to address all needs. Some level of mapping of shared interest across CEOS entities might be helpful.

- Emma Heslop (IOC) agreed that mapping of interests and priorities would be good and asked if the Oceans Coordination Group could take this on. There is a sense that the priorities include the societal benefits, where science can have a strong impact.

### 5.3: COVERAGE Project Summary and Evaluation

Presenters: Nadya Vinogradova Shiffer (NASA) [[presentation](#)]

Main points:

- The COVERAGE team implemented a cloud-enabled technical platform that provides harmonised access and analysis of satellite and *in situ* ocean data from distributed sources.
- This is an example of open science in action, delivering transferrable, open-source software to build upon.
- COVERAGE achieved all stated objectives:
  - Endorsed as a CEOS new initiative, fully compliant with the CEOS New Initiatives Process;
  - Developed a web-based platform for unified access to a curated set of inter-agency satellite and *in situ* data spanning four CEOS Ocean VCs; and,
  - Completed activities on schedule by December 2022, and as tracked in successive CEOS Work Plans since 2017.
- Nadya thanked Vardis Tsontos, Jorge Vazquez, and the COVERAGE team at NASA JPL for leading this five-year effort, as well as their CEOS partners: EUMETSAT, CNES, NOAA, and the European Commission.
- Next, Nadya expressed appreciation to the COVERAGE Advisory Board members, including EUMETSAT, NOAA, the Australia Bureau of Meteorology, Australian Integrated Marine Observing System and the University of Tasmania, CSIR, and Sargasso Sea Commission, for their cooperation in the successful development and implementation of the COVERAGE Initiative.

Main discussion points:

- Jörg Schulz (EUMETSAT) congratulated NASA and its successful completion of the program. A lot was learned, and there is a high possibility of future similar activities.

### 5.4: CEOS-COAST Pilots

Presenters: Paul DiGiacomo (NOAA) [[presentation](#)]

Main points:

- COAST and the UN Ocean Decade have made progress since SIT-37 by attending the Co-Design Workshops, conducting successful stakeholder outreach programs, publishing and presenting on pilot progress, and engaging in ongoing stakeholder co-design/co-development of products in several pilot regions.
- COAST has continued to work on co-developing thematic products with regional stakeholders in various project areas and achieved milestones such as expanding Geoscience Australia's shoreline mapping product, successful testing of coastal eutrophication and flooding products, and public beta-testing of the COAST Application Knowledge Hub, among others.
- He thanked CSIRO, the SEO, and other colleagues for their support with the EAIL platform.
- Digital Earth Africa Coastlines was launched at the GEO Blue Planet Symposium and is the first Africa-wide coastlines monitoring service that tracks continental changes from 2000 to present. The service monitors over 60,000 km of coast, and provides free interactive access to hotspots, rates of changes, and average yearly shorelines.

- With the use of CEOS Data Cube for shoreline, ISRO has been working jointly with WGISS to analyse the shoreline changes and estimate bathymetry at the Bay of Bengal.
- Next steps for COAST include transitioning demonstrated pilot products to additional regions, developing new products such as Blue Carbon, Habitat Mapping/Monitoring, and Biodiversity, expanding to future pilot regions in Asia and the Arctic, leveraging data from more missions, determining a continuity mechanism, and partnering with other international projects/programs such as CoastPredict.

### 5.5: Ocean Coordination Group

Presenters: Paul DiGiacomo (NOAA) [[presentation](#)]

Main points:

- The past five years have seen increasing discussion within CEOS around the coordination of its oceans and coasts.
- Since 2022 SIT Technical Workshop, the Ocean Coordination Group held five meetings, in which five candidate options for sustained coordination within CEOS were identified and then narrowed down to two options. The group engaged with the current and incoming SIT Chairs as well as all the COAST AHT, COVERAGE, and four Ocean Virtual Constellations.
- The first option proposed is to establish a two-year Aqua (Ocean and Coast) *Ad Hoc* Team (AHT) that could potentially become a new CEOS Working Group, with two sub-groups addressing technical and programmatic issues.
- The second option suggests establishing a dedicated Oceans/Coast Subject Matter Expert (SME) function under the SIT Chair Team to provide programmatic support and coordination internal to CEOS.
- The pros and cons of both options were presented.
- The Ocean Coordination Group (OCG) will take input from this session and finalise the option(s) paper, which will be briefed at an upcoming CEOS Secretariat meeting. After receiving input and a decision from the CEOS Secretariat, the OCG will create any relevant documentation and circulate it for review. At the SIT Technical Workshop, specific technical tasks will be pursued, and any final review and decision will be sought. Finally, at Plenary, a formal decision will be made for the implementation of the final option.
- OCG requested a six-month extension of the OCG to finalise this proposal by Plenary 2023.

Main discussion points:

- Jörg Schulz (EUMETSAT) expressed EUMETSAT's support for a time-limited trial of a mechanism that is focused on answering well defined questions that could be tested at the end of the trial. It is not clear what is being asked and what could be tested at the end of the extension. EUMETSAT would prefer not to add more coordination layers in CEOS, and it is unclear how this proposed coordination layer for VCs would work.
- Mark Dowell (COM) agrees it is a valid request to extend the discussion. He asked whether option 1 could just be a question of the language, and could be presented as coordination of what already exists, and distribution via distributed work planning.
- A couple of the related science working groups are associates of CEOS, which may impact the dynamics of how we engage with them. Should they be invited to become members of the ocean coordination efforts?
- Selma Cherchali (CNES) concurred with the EUMETSAT and COM comments, and agreed that trying to embrace all the topics related to ocean, coast, inland waters, in a very tight working group is not realistic. Adding coordination layers will require more and more resources and increase complexity. The question of when we stop the pilot and demonstration phase, and what follows is also unclear.

- Stephen Volz (NOAA) concurred with the six-month extension and agreed that identifying specific questions is important. A finite list of actions should be part of the deliverable at Plenary.

<b>DECISION 02</b>	Agreed to an extension until the 2023 CEOS Plenary for the Oceans Coordination Group to finalise the proposed way forward.
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## Thursday March 30<sup>th</sup>

Simonetta Cheli (ESA, SIT Chair) welcomed everyone to the second day of SIT-38, and thanked everyone for a nice evening at the social event last night.

Ivan Petiteville (ESA, SIT Chair Team) clarified the resolution regarding the extension of the Ocean Coordination Group yesterday, confirming the six-month extension was approved.

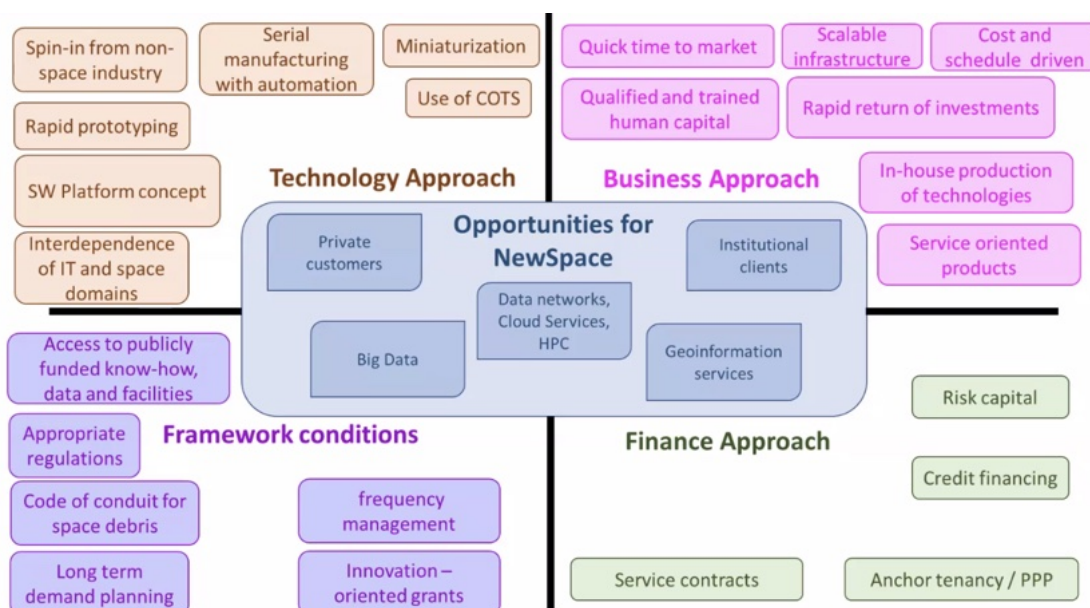
### Session 6: New Space

#### 6.1: Session Introduction

Presenter: Antonio Ciccolella (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- Reviewed the economy surrounding the space industry, and Earth observation’s place within this broader market. The EO commercial market remains a niche, about 3-5% of the total commercial space market.
- The traditional space market is characterised by a highly concentrated set of providers and users, with few and very large transactions. However, space is increasingly becoming commoditised.
- New Space is difficult to define. However, some defining characteristics include new technologies, rapid development, new business approaches, private financing, and close integration of information technology. Smaller satellites and large constellations are two more common characteristics.



- Trends supporting growth in Earth observation data products and services include the increasing availability of Earth observation data, democratisation of the use of Earth observation,

advancements in data fusion capabilities, and new emerging analytics markets. The downstream sector is an important driver.

- Identified four barriers to Earth observation commercial market expansion:



- New Space encompasses technology and business model innovations, driven by commercial interest of the private sector, with a prominent risk-taking approach. The term “New Space” is not univocally used; it may refer to two distinct concepts: Commercial companies characterised by business goals often driven by private investors, such as venture capitalists, seeking a return of investments; commercial, non-traditional manufacturing methods based on rapid development and focused on cost reduction and fast prototyping.
- A universally adopted definition of New Space is not available. Therefore a common definition of New Space for the objectives of CEOS is needed.

## 6.2: Agency Interventions

Moderator: Antonio Ciccolella (ESA, SIT Chair Team)

### UKSA

Presenter: Beth Greenaway (UKSA) [remotely] [[presentation](#)]

Main points:

- The UK Space Agency has a crucial role in implementing the government's National Space Strategy and supporting the thriving space sector in the UK. Its remit includes catalysing investment, delivering missions and capabilities that meet public needs, and championing the power of space to inspire people and support a sustainable future.
- Earth observation is identified as one of the eight priority areas of UKSA with focus on using it to drive discovery and tackle climate change.
- New Space often depends on traditional space agencies’ missions for intercalibration.
- UKSA supports New Space by providing direct investment in the form of grants to de-risk technology development or create pre-commercial applications, exploring market opportunities such as attending trade shows, participating in business case training and using sector reports, championing the space industry by attracting government and new investors, including local councils and commercial users, promoting standards and the concept of “trusted data”, addressing the skills gap on a national basis.
- TRUTHS mission will enable an upgrade of the performance of the global EO system both in space and on ground. This will also enhance the performance of other satellites. The UK is leading seventy percent of the training program and aiming to inspire a new generation.
- UKSA also supports New Space through ESA EO Programmes such as InCubed2, SCOUTS (FutureEO), purchasing third party mission data (Earthnet).
- Raised some points for discussion:
  - How should the activities of CEOS incorporate all missions?;

- Should the data policy of CEOS be adapted to account for different business models – or should institutionally bought data be available as free and open like the data of institutionally built missions?; and,
- How do we collectively ensure all types of missions can be progressed to suit all types of user needs? What are the win- wins?

Main discussion points:

- Ivan Petiteville (ESA, SIT Chair Team) recalled that Beth Greenaway (UKSA) has been instrumental in the production of the ‘Think Piece’ document of the New Space Task Team, and thanked her for the contributions. Ivan noted that assessing the quality of data is also an important factor when considering data policies.

## JAXA

Presenter: Yuko Nakamura (JAXA) [[presentation](#)]

Main points:

- Consortium for Satellite Earth Observation (CONSEO) is a platform that brings together players from industry, academia, and government to envision and create the future of satellite Earth observation for Japan.
- The community consists of diverse players, with JAXA playing a central role as the secretariat and an implementer of national space policy.
- The CONSEO community has envisioned the future society to be realised by satellite EO through discussions in Japanese Fiscal Year 2022 (JFY2022). In JFY2023, CONSEO will shift its focus to promote co-creation and partnership to foster space business.
- Asia-Pacific Regional Space Agency Forum (APRSAF) represents an opportunity to engage with international partners in the Asia-pacific region.

Main discussion points:

- Antonio Ciccolella (ESA, SIT Chair Team) noted that it is interesting to see this partnership in Japan which has a different focus, oriented to societal rather than commercial priorities.
- Stephen Volz (NOAA) asked whether the strategy with recommendations, referenced in the slides, is on schedule and if it can be shared with CEOS. Yuko Nakamura (JAXA) noted that it was delivered to the Japanese government last week but is not suitable for this community. The message is that many diverse community members share the goals of the EO sector and are working towards this vision.

## NASA

Presenter: Frederick Policelli (NASA) [remotely] [[presentation](#)]

Main points:

- NASA’s Commercial Smallsat Data Acquisition (CSDA) program was initially a pilot program which became a sustained program in 2020 to evaluate data from operating commercial small satellite constellations. The restrictive nature of the End User Licence Agreements (EULAs) made standard scientific collaboration difficult and is something that must be addressed in future data purchases.
- The objectives of CSDA program are to establish a continuous and repeatable process to onboard new commercial data vendors; enable sustained use and dissemination of purchased data by the Earth science community; ensure long-term data preservation, access, and distribution; and coordinate with other US government agencies and international partners on the evaluation and scientific use of commercial data.
- The licensing uplifts through the help of CSDA program will make the data more readily available across the government and improve both value and interagency collaboration.



## Main discussion points:

- Antonio Ciccolella (ESA, SIT Chair Team) asked when the report on SAR of CSDA will be publicly available. Frederick Policelli (NASA) noted the Airbus offerings should be available in the next two months. Management at NASA headquarters has already been briefed on results and are awaiting a report to Airbus.
- Mark Dowell (COM) noted NASA has consulted with WGCV and others on the mission quality frameworks and guidelines, and asked when these guidelines would be available. The internal analysis of GHGSat by ESA was also noted, and Mark understands NASA has done something similar. Would this analysis be included in the framework and guidelines?
- Simonetta Cheli (ESA, SIT Chair) recognised ESA and NASA have a bilateral General Principles and Practices Group (GPPG). Inside the group, there is a working group that looks at assessment of the value of data of various companies, and the next bilateral discussion will certainly cover GHGSat.
- NASA is also working towards a set of guidelines for data assessment, which would cover the type of data GHGSat is providing. They plan to work with ESA to produce new guidelines for that type of data.
- Broader availability of reports on guidelines would be helpful, including on SAR and optical data evaluation. There are joint deliverables for ESA and NASA in the CEOS Work Plan ([OUT-23-05](#), [OUT-23-06](#)), which should be completed by the end of the year.
- Philippe Goryl (ESA, WGCV Chair) noted some of these points will be addressed in the bilateral project, where ESA have done a number of New Space supplier data assessments, including ICEYE (SAR), and GHGSat (1st assessment). These reports will be available soon, and a second round of assessments is planned.
- Steve Labahn (USGS, LSI-VC co-Lead) agreed the evaluation is of interest, e.g., radiometry and geometry. There are other questions, e.g., CEOS-ARD compliance, General metadata, per pixel metadata, etc.
- Frederick Policelli (NASA) noted NASA has five metrics against which all data providers are assessed, and one of them is metadata compliance to standards.
- Philippe believes there is an assessment of the quality of the metadata, but not against the compliance of CEOS-ARD specifications. This is not directly applicable to high resolution sensors, but for SAR this may be different.
- For the ARD23 workshop, the ARD Oversight Group is discussing how to ensure the specifications are applicable for high resolution New Space data. The development of the OGC / ISO ARD standard is also underway, which will be highly applicable to New Space.
- NASA performs a general assessment of the metadata quality, but not a full CEOS-ARD assessment at this stage. This is complicated by the applicability of CEOS-ARD to high resolution datasets.
- Stephen Volz (NOAA) noted with reference to the NASA-ESA joint program on assessment, it would be useful to have a WGCV assessment of what we think is an appropriate standard for all data as a basis for a common approach to understanding the quality.
- Philippe noted that the NASA-ESA approach has been adapted by WGCV into the Cal/Val maturity matrix (will be presented in the upcoming WGCV presentation). Originally this was an NASA-ESA activity and it is now being discussed within CEOS. The Cal/Val framework was put in place to assess how compliant data is with this framework. Ivan Petiteville (ESA, SIT Chair Team) noted the NSTT working document references this activity.
- Klaus Schmidt (DLR) via chat: *public sharing within the whole CEOS community of these joint assessments, both from NASA and ESA would be welcome.*

### 6.3: New Space Task Team (NSTT)

Presenter: Antonio Ciccolella (ESA, SIT Chair Team) [[presentation](#)] [[Think Piece](#)] [[Working Document](#)]

Main points:

- The New Space Task Team was established at CEOS Plenary 2022, with a one-year duration. The team has two objectives:
  - o Explore collaboration opportunities in New Space that bring mutual benefit to all parties, in delivering public benefit, including the identification of concrete actions; and,
  - o Continue sharing country-level experience among CEOS.
- The team has held three meetings over the first few months of 2023, commencing with an assessment of the areas and issues that are common among CEOS agencies and that are predicted to impact public EO programmes in future.
- The main goal of this SIT-38 session is to share additional experiences and accelerate the definition of actions.
- The team will issue a white paper with findings and recommendations at CEOS Plenary 2023.
- 15 Activities have been identified, with varying levels of progress. These can be found in the [Working Document](#).

### 6.4: Discussion

There are seven questions presented for CEOS Principal debate and discussion:

- What is meant by "New Space"?
  - o Steve Labhan (USGS, LSI-VC co-Lead) recalled some of the main points from his presentation at Tuesday's side meeting, discussing the IEEE Paper aimed at defining New Space.
  - o Should we consider new space and traditional commercial companies differently?
- What is out of scope?
- What could be the win-win partnership opportunities?
- What interactions have there been so far at the CEOS agency level - lessons learned?
- What does an integrated EO industry look like?
- What can CEOS do for New Space?
- What can New Space do for CEOS?

Main discussion points:

- Stephen Volz (NOAA) asked how we could reconcile old and new space. Do we have different engagement strategies with new and old space? Their responses might be different, but the standards should be the same, and in this sense, it is not clear whether we should make a distinction.
- Ivan Petiteville (ESA, SIT Chair Team) noted that big companies have different financial structures, more employees, and expertise in EO. When thinking about the downstream sector, with New Space we are often looking at very small companies, some of which lack EO expertise and capacity. There is a role here in helping those that don't have the resources of the traditional space companies.
- Stephen Volz (NOAA) suggested this means a capacity development exercise, and CEOS has expertise and capacity to see how that can be of benefit to them.
- Ivan Petiteville (ESA, SIT Chair Team) noted what we do for small companies for ARD, can also be used by big companies. All can benefit from the same efforts.

- Jonathon Ross (GA) supported Ivan's points, noting that although most of the agencies/nations represented around the table are space powers with budgets permitting the capability, that is not the case for all agencies and countries. CEOS should focus on standards, with the idea of ensuring that countries are not locked into single data sources, and making as much data available as possible. For GA, space data is considered as critical infrastructure, and CEOS has a role in shepherding the open availability of data.
- Mark Dowell (COM) suggested one view of New Space would be to look at the value chain, and at different points along the chain. The working document makes a distinction between upstream and downstream, but more granularity may be needed.
- Alex Held (CSIRO) agreed that from a CEOS perspective, setting the standards is a great way of engaging with the commercial sector. This helps have a conversation about their data business models, specifically when looking at some of the tools we are using, many users are not just scientists but general users, and they just want to buy the data they need, though the pay per use model is not yet adopted across industry data providers. CEOS actions could promote and foster additional business models, for example addressing millions of users across the cloud rather than just large institutional users.
- Ivan Petiteville (ESA, SIT Chair Team) noted the working document addresses data distribution models, and this has been thought about in WGISS. This is a more important consideration with New Space than it was with commercial engagement in the past.
- Timothy Stryker (USGS) noted that for CEOS members it is very important to understand the situation and motivation of New Space companies in contrast to traditional space companies. CEOS shouldn't really be treating users differently based on our classifications, and mutual benefits should be kept in mind. Many CEOS Agencies are public agencies and the first priority for us is to invest wisely, look after our interests, and look for opportunities with any scope of commercial space company. Tim suggested we should not worry too much about how we characterise New Space.
- Beth Greenaway (UKSA) agreed that CEOS does not need to modify what it does, but needs to reflect that new actors are working on shorter timelines, and generally with fewer resources/staff. They don't always have the capacity to engage in setting standards. They want to be told what to do with standards, pick up and go ahead with minimal effort on developing these standards.
- Jörg Schultz (EUMETSAT) agreed with Mark's comments around considering the value chain and considering value chains for different types of applications. For example, these data products are not yet close to being able to contribute to climate science. He noted the example of Spire as an application where a contribution is being made. Different standards are important for different types of applications and could be captured in a matrix. Jörg agreed that all should be treated equally, no matter their size.
- Klaus Schmidt (DLR) via chat: *DLR agrees and underscores the statement from EUMETSAT, in particular with reference to the "Climate" area where facts and truth are the core and testimonial and overselling is unhelpful.*
- Ivan Petiteville (ESA, SIT Chair Team) noted that as CEOS, we cannot act in the same way agencies do in their home countries. Each agency has its own methods of dealing with their industry.
- Julie Robinson (NASA) noted NASA is quite enthusiastic about the opportunities and noted that the Earth venture program is dependent on developments like cheaper launch. The distinction is not new vs. old, but rather around business models. The aerospace defence sector is operated one way and they are happy for us to do the science. New companies are much more interested in an end-to-end user model, and this can cloud the space with users not familiar with EO. Julie noted the SEO's work on how to use EO data. The value chain may help to identify the most urgent needs. Fundamentally, NASA is interested in a competitive space that will continue to drive innovation.

- Pakorn Apaphant (GISTDA, CEOS Chair) noted that for New Space in Thailand, it is commercial companies who see new opportunities for their business. The size and scale does not matter - opportunity is key. GISTDA organised a New Space event and invited companies that want new opportunities in space. For Thailand, this starts from upstream data supply. The CEOS community needs to agree how we can support and be careful to not go out of scope.
- Osamu Ochai (JAXA) noted the application-by-application process, and suggested that maybe we can all share approaches further. He noted the IMEO example as a case where the combination of public and private data is being used, e.g., GHGSat, GOSAT, TROPOMI, etc. This may be a clear example that CEOS could think about lessons learned and transferring to other activities.
- Osmau also suggested CEOS should increase its representation at relevant workshops and symposiums where the new commercial space is participating and make sure our efforts are seen and promoted.
- Ivan Petiteville (ESA, SIT Chair Team) agreed with the complementarity between private and public mission demonstrated within IMEO, to the benefit of the user.
- Eric Laliberté (CSA) noted that the business models and data quality often pertain to operational use vs. scientific use. He also noted the importance of the interagency space debris committee, and how we manage the reality of large constellations of small satellites. We cannot dictate methods, but we can issue advisories. In terms of timing, we can't slow down new space (which is profit driven), but thinking about interactions (e.g., data, ARD, etc.) is important.
- Simonetta Cheli (ESA, SIT Chair) highlighted the progress on New Space overall, but would like to see from CEOS a clear definition of New Space. She noted this is also a problem within Europe, and a progressive step would be to clarify this definition. ESA is working, as a public agency, to understand how to best support the start-ups. Developing the complementarity JAXA expressed and working via different mechanisms and models are potential areas for action within CEOS.
- Mark Dowell (COM) agreed that working on different models (e.g., anchor tenancy, etc.) is important. IMEO is perhaps a good example, but we have much longer standing examples. For example, for disasters, agencies provide their own data but also subsidising data from national commercial suppliers, and in this the traceability to user requirements and needs is important. With this traceability, complementarity between public and private data can be evaluated more clearly. How complementarity provides additional capabilities to address user needs is a key point to be explored.
- Ivan Petiteville (ESA, SIT Chair Team) reminded CEOS about feedback requested for the New Space think piece document by 14 April 2023. The NSTT will then consolidate and discuss the feedback at a telecon in the last week of April.

<b>SIT-38-04</b>	CEOS Agencies invited to comment on the New Space Task Team (NSTT) Paper ahead of the next Team call (last week of April or first week of May)	<b>14 April 2023</b>
	<i>Rationale: In light of SIT-38 discussions, further reactions and refinements are invited on the NSTT paper</i>	

## Session 7: CEOS Working Group and Virtual Constellation Topics

### 7.1: Session Introduction

Presenter: Philippe Goryl (ESA, SIT Chair Team) [[presentation](#)]

Main points:

- Philippe gave an overview of what will follow in this session and noted that a number of the topics are applicable to the discussions around new space.

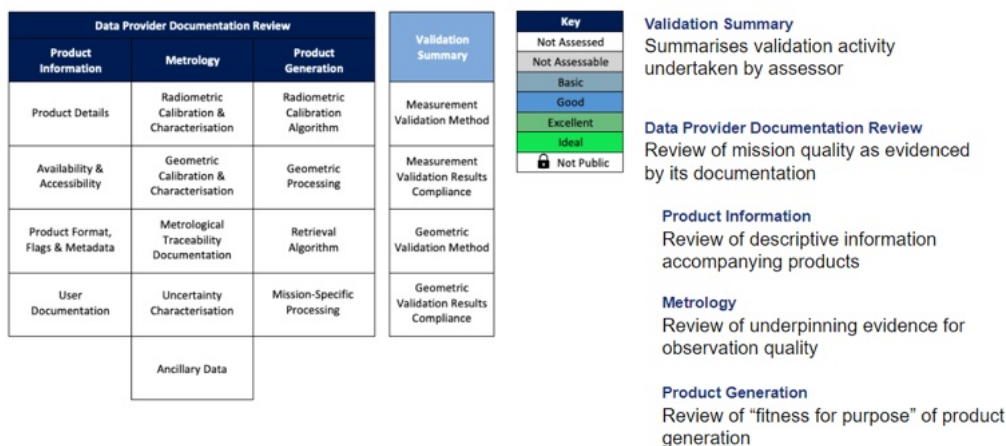
## 7.2: Opportunities for Engagement with Commercial Sector in Calibration and Validation

Presenter: Philippe Goryl (ESA, WGCV Chair) [[presentation](#)]

Main points:

- A Framework for EO Product Quality Assurance was developed in collaboration between ESA and NASA, with the National Physical Laboratory.
- It has been projected that there will be over 8,000 commercial satellites by 2030, with the most explosive growth in the hyperspectral and hybrid sensor domains. Space agencies are seeking to evaluate the quality of the data systematically to understand how it may be integrated into their programmes.
- The EO community has been developing comprehensive definitions of what is meant by mission quality. These include:
  - o Analysis ready data and interoperability – e.g., CEOS ARD;
  - o Fiducial Reference Measurements;
  - o Uncertainty evaluation e.g., Sentinel-2, Sentinel-3, Landsat 9; and,
  - o Traceability – CLARREO, TRUTHS, Libra missions.
- The assessment framework is aimed at verifying claimed mission performance and adheres, where applicable, to community best practices to an extent that is “fit for purpose”. The assessment is divided into two parts: a review of the mission’s quality as evidenced by its documentation, and a validation analysis performed by a mission quality assessor.

## Framework Structure



- More explanation can be found at: [https://www.youtube.com/watch?v=IRjR\\_611-ao](https://www.youtube.com/watch?v=IRjR_611-ao).
- NASA and ESA are working toward a comprehensive ESA-NASA Evaluation Framework. The Earthnet Data Assessment Project (EDAP) is intended to perform quality assessment for various EO missions in the QA4EO, Earthnet and New Space context. The EDAP approach aims to define a mission quality Cal/Val Maturity Matrix, which provides input for quality aspects to the CEOS WGISS Data Management and Stewardship Maturity Matrix. The assessment provides an opportunity to communicate between CEOS Agencies and New Space companies.
- WGCV is establishing a joint task team with GSICS to promote dialogue and coordination among agencies operating and developing SI-Traceable Satellite missions (SITSats). The task team will focus on collaborative activities, mission coordination, new technologies, and interoperability

topics, aiming to build an integrated system approach to the development and utilisation of SITSat missions.

Main discussion points:

- Jonathon Ross (GA) noted this is a great body of work and asked if NASA and ESA are planning for it to be adopted as a CEOS framework. Philippe Goryl (ESA, WGCV Chair) noted it started as a bilateral activity, but it is in the process of being adapted by WGCV and integrated into the wider WGISS framework.
- Jonathon noted that honest reports of quality could help inform user decisions about whether the data is good enough, i.e., fit for purpose, ensuring users are sufficiently well informed.
- Philippe Goryl (ESA, WGCV Chair) noted the deliberate avoidance of terminology such as 'good' or 'not', but rather following a maturity matrix approach based on the standard. Fitness for purpose is not assessed. What WGCV are developing now is extending the maturity matrix to a fitness for purpose assessment.
- Mark Dowell (COM) noted in some cases, agencies are the users. He agreed that the maturity matrix is a good basis to start the dialogue.
- Philippe Goryl (ESA, WGCV Chair) noted that related to fitness for purpose, the maturity matrix is a tool which gives an indication. It is intended that this tool will be used as a part of an ongoing process, for example, within the Copernicus continuity missions to complement the Sentinel missions.
- Jörg Schulz (EUMETSAT) asked how to convey such a matrix to a commercial company. For example, would it be used to drive investment? Could it be used to identify gaps? Philippe confirmed this is one of the objectives of the dialogue, to communicate an initial assessment to a data provider, with the aim of improving things in their process where needed. This has happened for example with Planet, where quality increased. Initially, this was related to the quality of documentation, which was an easy point to address.
- Forums such as VH-RODA and JACIE are useful for the dialogue with New Space.

### 7.3: CEOS Interoperability Framework

Presenter: Makoto Natsuisaka (JAXA, WGISS Chair) [[presentation](#)]

Main points:

- The CEOS Interoperability Framework was first proposed by LSI-VC. At the 2022 CEOS Plenary, it was agreed that the coordination of interoperability related work remains within the WGISS scope, and WGISS was given an action to take forward the further definition of such a framework/roadmap.
- WGISS invited contributors from other CEOS entities and organised the framework development team. Makoto Natsuisaka from WGISS led the team, and contributors include members from WGISS, WGCV, LSI-VC, CEOS-ARD Oversight Group, and the SEO.
- The Interoperability Framework is built around the idea of interoperability factors (i.e., syntactic, semantic, data architecture, data accessibility, and common references). These are key areas where advancements are generally needed in order to increase the interoperability of EO datasets, and the idea is to assign a lead from existing CEOS entities as lead for each of these factors.
- The development team requests extension of the roadmap due by the SIT Technical Workshop (October 2023) to continue work refining these interoperability factors and defining responsibilities across CEOS.

- Tom Sohre (USGS, WGISS Vice-Chair) noted they have done a lot of work to develop the blocks, and see the work continue to evolve before the SIT Technical Workshop, seeking coordination across a number of CEOS entities.
- Peter Strobl (COM-JRC, LSI-VC co-Lead) provided an update on action CEOS-36-11: *“CEOS Agencies to consider nominating individuals to the ongoing WGCV / WGISS / LSI-VC effort to define a CEOS common dictionary of terms.”* Peter, Katrin Molch (DLR) and Emma Woolliams (NPL) have compiled a paper on the first phase of work, which will be published shortly. The action will be closed at SIT-38, but the group is still looking for additional personnel to help advance the effort as a key part of CEOS interoperability discussions.
- None of the existing definitions are sufficient to support the interoperability of data.
- It was also noted that the format should be optimised for online utilisation.

#### Main discussion points:

- Philippe Goryl (ESA, WGCV Chair) noted the semantic block is under discussion, and progress is being made within WGCV.
- No objections were raised to the request for an extension.
- Anyone who is interested in participating should contact the WGISS Chair.

<b>DECISION 03</b>	Agreed to extend until the October 2023 SIT Technical Workshop the deadlines for Actions 36-10 and 36-11 from 2022 CEOS Plenary, in relation to an interoperability framework from WGISS and volunteers from CEOS agencies to contribute.
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#### 7.4: CEOS Engagement with Standards Organisations

Presenter: Matthew Steventon (SIT Chair Team) [[presentation](#)]

##### Main points:

- Consultation with the CEOS community at the 2022 SIT Technical Workshop side meeting agreed that more coordination on the engagement of CEOS with standards organisations would be beneficial.
- At the 2022 CEOS Plenary, it was suggested that CEOS establish a regular reporting opportunity during the Plenary and SIT Technical Workshop meetings to raise awareness and ensure CEOS does not miss out on opportunities.
- It is important to identify any gaps where CEOS is not represented and may be negatively impacted by the decisions made by these groups.
- The first step would be to compile an inventory of existing CEOS engagement, and the SIT Chair is convening a discussion to gather inputs from WGCV and WGISS, both of which have experience in these discussions. Other verbal inputs are also welcome.
- Regarding action *CEOS-36-09: “SIT Chair to organise a dedicated session on the topic of CEOS engagement with standards organisations at SIT-38 and to invite CEOS entities to present their experience and status, with the aim of creating a snapshot inventory,”* an incomplete list of engagements was presented, but no action has been taken to make the list comprehensive.
- WGISS is seeking a volunteer for an activity related to standardisation but acknowledges that they do not have many experts or resources in this area, except for Liping Di, who is a liaison with OGC/ISO-TC211. While direct commitment to the activity may be difficult, WGISS will support it through regular members of OGC/ISO-TC211 in individual agencies.

- If CEOS sees itself as supporting standards for New Space, we need a way of coordinating. To date, there has been very little appetite or resources for this activity. It was suggested that this could be considered further by the New Space Task Team.
- The Spatio-Temporal Asset Catalog (STAC) is an example of the community taking standard development into their own hands. This has been developed into a *de facto* standard, with some CEOS *ad hoc* contribution to the efforts. WGISS is now reacting and developing STAC best practices, i.e., we are reacting to the standards set by the community, rather than engaging proactively.

#### Main discussion points:

- Timothy Stryker (USGS) noted standards are a very important topic for CEOS, whether this coordination should occur within the New Space Task Team or elsewhere. This is a topic CEOS should be keeping an eye on, and increasingly we are having to be reactive to the work of other groups. This should include international standards, and while OGC isn't necessarily a standards organisation, its work can lead to standards, and has in the past. USGS supports addressing this under the New Space Task Team, and will try to contribute some capacity.
- Jonathan Ross (GA) offered the support of GA, noting however that it is not clear yet what this support should be. GA would like to see EO deliver impact. He noted that COVID highlighted the issue of supply chain resilience, and potential disruption of supply chain is a barrier to uptake. Standards play an important role in source switching, which supports resilience.
- John Remedios (UKSA) noted that in the UK, the community is aware that standards are very important. However, it is not well understood. UKSA is trying to improve their understanding by talking to relevant standards experts. This is a slow process, but CEOS agencies should be concerned, noting the reference to this in the GHG Task Team presentation yesterday.
- Makoto Natsuisaka (JAXA, WGISS Chair) confirmed WGISS is willing to treat STAC as a community-based specification, and it is already well defined. STAC is also used by many non-EO users, and WGISS would likely recommend STAC and STAC APIs as best practice. This will be a key component of the interoperability framework.
- Matt Steventon (SIT Chair Team) clarified that we are not talking about the standardisation of STAC necessarily, or even STAC at all. The important point is that these are the tools defined and used by the community, and now CEOS is largely reacting to these developments. The community is not waiting for CEOS.

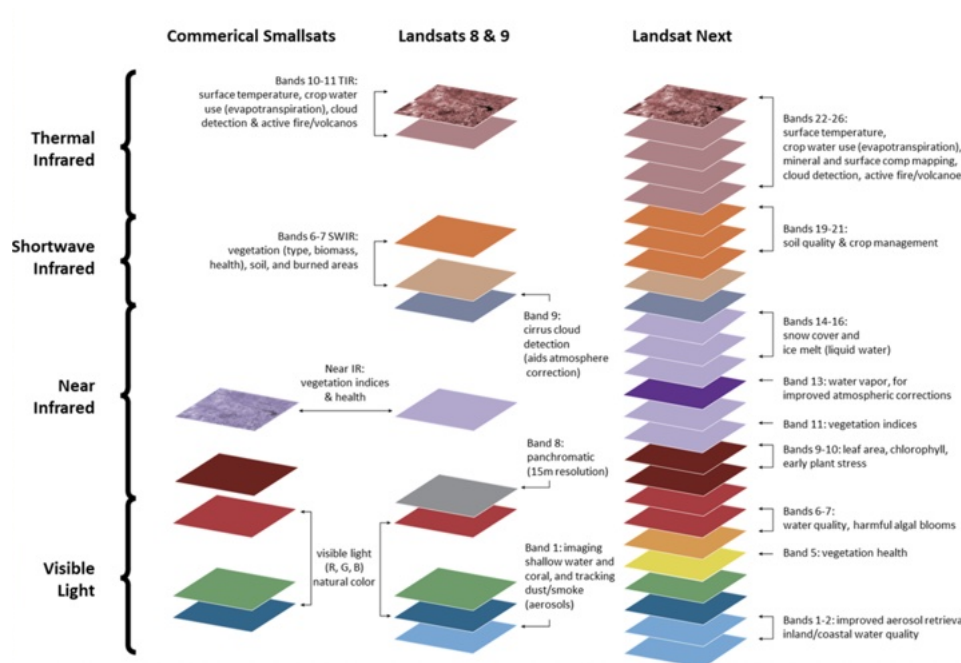
### 7.5: Landsat Next Update

Presenter: Timothy Newman (USGS) [[presentation](#)]

#### Main points:

- The fundamental goal of the USGS National Land Imaging program is to ensure public availability of a primary data record about the historical condition and current state of the Earth's land surface and to predict its future condition.
- The Landsat archive contains 10 million unique scenes, with over 100 million downloads since 2008. In the past year alone, there have been over 4 billion accesses to Landsat data via commercial cloud services.
- Landsat Next is the second phase of the Sustainable Land Imaging (SLI) program.
- USGS engaged with the user community to develop and prioritise requirements for Landsat Next. These requirements include improved revisit frequency to support applications like crop health, higher spatial resolution for monitoring small fields and urbanisation, additional spectral bands for water quality and other emerging applications, and maintaining the radiometric quality established by Landsat 8/9.
- A constellation of three Landsat Next satellites will provide a global revisit of 6 days.





- Landsat Next is intended to replace Landsat 8 in the event of an unexpected failure of Landsat 9, ensuring continuity of the Landsat data record.
- A video was shared, which can be viewed [here](#).

#### Main discussion points:

- Stephen Volz (NOAA) noted the opportunity for cross-calibration between the new Landsat bands, and the 22 VIIRS bands. Timothy Newman (USGS) confirmed this topic is being worked on between the two agencies.
- John Remedios (UKSA) asked about overlap with Land Surface Temperature Monitoring (LSTM), and plans for cross-calibration. Timothy Newman (USGS) responded that LSTM is scheduled for an afternoon orbit, while Landsat Next is planned for 10am, hence cross-calibration would be difficult. Five thermal bands are planned for Landsat Next, and opportunities for the comparison of these bands with LSTM will be studied.
- Mark Dowell (COM) highlighted that many user requirements are being addressed through Landsat Next, along with the NextGen Sentinel missions. This temporal and spatial resolution provides an opportunity to look at water applications, and this is the first time we are seeing these typically land instruments having applicability in the aquatic domain. The Australian SIT Chair work related to this, and there is a blue carbon link. This has the potential to make a step change in the scope of applications. Timothy Newman (USGS) confirmed that many of the new bands are driven by inland and coast applications.
- Osamu Ochiai (JAXA) noted that Landsat Next is an important component of the AFOLU Roadmap. Linkages with the IPCC guidelines are important, and perhaps Landsat Next requirements could be cross checked with these guidelines.
- Alex Held (CSIRO) noted the link to Aquawatch and highlighted the [video](#) which was shown during the break. This links back to the 2017 study on the remote sensing community, leading to the specification of payloads for water quality monitoring and early warning systems.
- Jonathon Ross (GA) congratulated NASA and USGS, and noted the large impact of this program. He asked if there has been a decision on plans for Landsat-8 and Landsat-9 if they are still flying at the time. Timothy Newman (USGS) noted there are no plans to deorbit anything, and they will be watching the instruments closely.

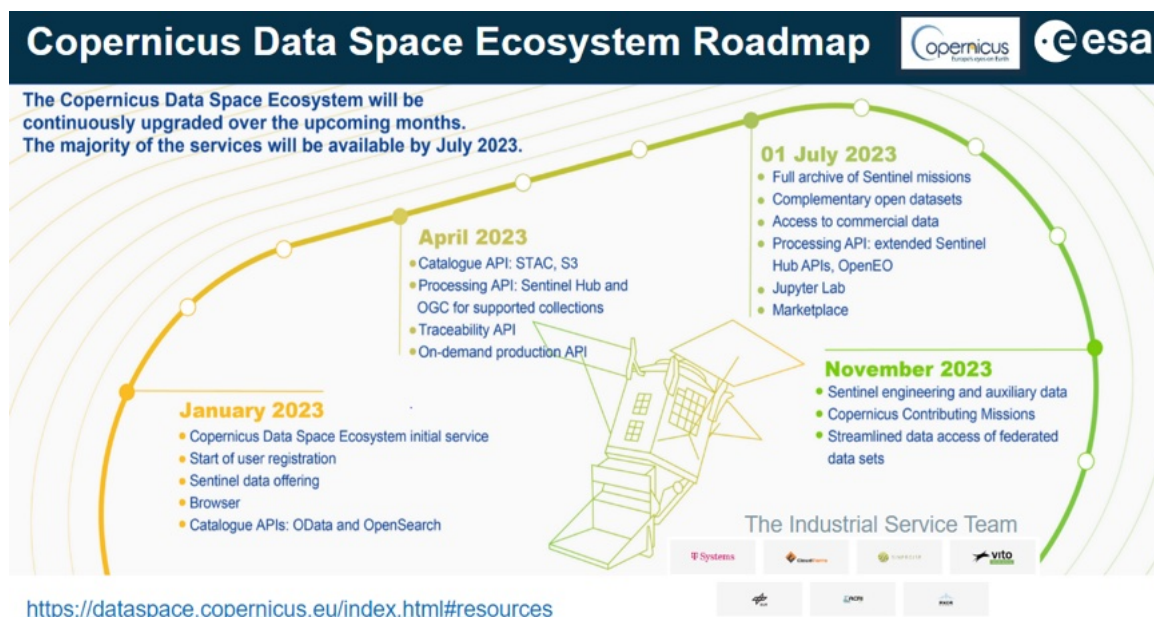
- Steve Labhan (USGS, LSI-VC co-lead) noted the link to CEOS-ARD link with the atmospheric correction link built in.

## 7.6: Copernicus Data Space Ecosystem

Presenter: Ferran Gascon (ESA) [[presentation](#)]

Main points:

- The main features of Copernicus Data Space Ecosystem are the open ecosystem, public services complemented with extended commercial capacity, 3<sup>rd</sup> party services deployments, federation capabilities, open and free services (under a fair use policy), adjustable capacity and performance, rich data portfolio with Copernicus Sentinel data and CCM core data sets made easily available, data distribution service combined with advanced processing APIs and services and cloud resources.



- The service is available at <https://dataspace.copernicus.eu>.
- The contact email is [help-login@dataspace.copernicus.eu](mailto:help-login@dataspace.copernicus.eu). More updates will be available at <https://dataspace.copernicus.eu/index.html#news>.

## 7.7: EOTEC DevNet Sustainability Plan

Presenter: Jorge Del Rio Vera (UNOOSA, WGCapD) [[presentation](#)]

Main points:

- Action CEOS Plenary 36-04: *CEOS members to review the proposed EOTEC DevNet Sustainability Plan and consider the outlined approaches to staffing, including in-kind support for the part-time positions of regional community of practice coordinators – in anticipation of further discussion at SIT-38.*
  - EOTEC DevNet is staffed until next year thanks to the generosity of NASA and University of Jena, and other members of EOTEC DevNet are contributing with in-kind support.
  - A Sustainability Plan was presented at 2022 SIT Technical Workshop and Plenary. No further review is needed, but WGCapD requests authorisation to carry on the initiative. They would like to request limited support from the SEO, and additional in-kind support from CEOS members is most welcome.
  - WGCapD would like to present the results and achievements of EOTEC DevNet at the 2023 SIT Technical Workshop.

- Action CEOS Plenary 36-12: *WGCapD Chair and SEO to discuss training and capacity development opportunities for CEOS SDG work in the context of EOTEC DevNet.*
  - The SEO presented on the work of the CEOS SDG Coordination Group at the UN-Space/WGCapD-12 joint meeting in February 2023.
  - WGCapD presented to the SDG Coordination Group at the side meeting on Tuesday, regarding results and opportunities following the UN-Space/WGCapD-12 joint meeting.
- EOTEC DevNet conducted an initial Network Analysis of their users using social network analytics methods, which resulted in a Network Intelligence Dashboard that can be used to observe overall performance.
- WGCapD-12 focused on identifying areas of action for different actors to continue moving forward in capacity-building and data democracy in the use of Earth observation. The meeting was held in conjunction with UN-Space in Vienna.
- A key message from the joint UN-Space and WGCapD-12 meeting was the need for more standardised data and capacity building resources.
- Regarding WGCapD sustainability, there is a need for more participation in the Working Group to achieve the goals of CEOS, which has been communicated throughout SIT-38, of promoting EO to decision and policy makers and their related users.
- Need to identify a WGCapD Vice-Chair by the time Jorge steps down as WGCapD Chair at the end of the 2023 CEOS Plenary.

#### Main discussion points:

- WGCapD is requesting an extension to 2025 of the EOTEC DevNet programme. The WG is not looking for additional resources, as these have already been secured thanks to NASA and University of Jena. However the continued support of the SEO is requested, to which Dave Borges (NASA, CEOS SEO) has already agreed. No objections were raised to the activity continuing.

<b>DECISION 04</b>	With the extension of EOTEC DevNet, the SEO confirmed continued support of existing hazard (Flood, Drought) trackers, website content maintenance and associated communications needs.
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<b>SIT-38-05</b>	There is an open call for CEOS Agencies to consider nominating a Vice-Chair for WGCapD. The current Vice Chair from SANSa will become WGCapD Chair at the close of 2023 CEOS Plenary	<b>Plenary 2023</b>
	<i>Rationale: All CEOS Working Groups needs both a Chair and Vice-Chair to operate effectively and to assure continuity of leadership for activities.</i>	

#### 7.8: WG Disasters and Kahramanmaraş Supersite

Presenter: Laura Frulla (CONAE) [[presentation](#)], Stefano Salvi (INGV, GEO-GSNL, WGDisasters) [[presentation](#)]

#### Main points:

- The 2023-2025 priorities of WGDisasters include a focus on the operational uptake of satellite EO at the local scale to increase resilience and sustainability.

- They will increase their focus on capacity building and strengthen ties with other GEO Working Groups. The group will also explore linkages to climate-related activities and exploit new technology opportunities, such as new missions, activities, or data exploitation techniques.
- The WGDisasters have been working with other CEOS groups such as WGCapD, WGClimate, WGISS, SIT, New Space Task Team (NSTT), Ocean Coordination Group and GEO on various activities.

Stefano Salvi (INGV, GEO-GSNL, WGDisasters) reported:

- GEO-GSNL is a network of 13 permanent supersites and the San Andreas Fault Natural Laboratory. Temporary event supersites can be established for special events. This makes a large quantity of seismic, geodetic, geological, geochemical, gravimetric data available to the scientific community to aid in recovery efforts.
- ASI's CSK-CSG, DLR's TerraSAR-X, CONAE's SAOCOM and CNES's Pleiades missions are supporting the monitoring of the supersites.
- The Kahramanmaraş seismic sequence that started on 6 February 2023 has been a major disaster, and the international scientific community quickly generated potentially useful data products, which were openly shared. A Supersite was established, with a planned duration of one year.
- The Marmara Permanent Supersite was established in Turkey in 2014, and focuses on the Istanbul metropolitan area, which has the highest seismic risk in Europe (50% chance of a M7.3 in 30 years).
- The Kahramanmaraş event supersite is coordinated by researchers from the Istanbul Technical University and Kandilli Observatory and Earthquake Research Institute (KOERI), who provide scientific information to AFAD and other responding agencies using an Open Science approach.
- Kahramanmaraş supersite [webpage](#) provides information on the availability and access to EO data specifically obtained from CEOS agencies, how to access *in situ* observations from local ground networks, and how to publicly share data and scientific results.
- Requested JAXA to provide access to additional ScanSAR ALOS-2 PALSAR-2 data for the supersite scientific community, over the Event supersite, and other Permanent supersites.

Main discussion points:

- Osamu Ochiai (JAXA) welcomed the utilisation of ALOS-2 and noted that JAXA has recently announced the opening of the ScanSAR L2.2 and L1.1 data, accessible via Google Earth Engine.
- Atipat Wattanuntachai (GISTDA) asked all CEOS entities to highlight any observation gaps they identify, as this could be a good contribution to the New Space Task Team.

### 7.9: Session Remarks

Main discussion points:

- None raised.

### 7.10: Precipitation Observation and Product Continuity

Presenter: Christopher Kidd (NASA, P-VC) [[presentation](#)]

Main points:

- The Precipitation Virtual Constellation consists of the Global Precipitation Measurement (GPM) Core Observatory and a constellation of international partner satellites and sensors, providing a mean revisit time of 3 hours, 90% of the time. The retrieval resolutions are sensor-dependent but generally 15-20 km. The GPM products also use data from the Geostationary Vis/IR sensors to improve temporal and spatial sampling. All but the GPM-Core satellite are in sun-synchronous orbits.

- A low-inclination ‘calibrator’ sensor(s) is critical for any constellation – but may/will not be available after GPM completes its mission.
- Highlighted the fact that there have only ever been two dedicated precipitation instruments flown on satellites, TRMM and GPM. Temporal gaps could be filled with smallsats.
- Vis/IR GEO-observations are an integral part of global precipitation measurement primarily due to their temporal sampling and good spatial resolution.
- CGMS/IPWG have identified 89 precipitation data products. More information is available at <http://ipwg.isac.cnr.it/data.html>.
- NASA Precipitation Processing System (PPS) currently acts as a central processing hub. PPS activities will end within a year of the end of GPM (likely 2028), and the loss of PPS activity presents a number of data continuity risks for precipitation datasets.
- The post-GPM era will see the emergence of new precipitation-capable missions, which raises questions about who will process their data and ensure quality control, organisation, and distribution. Additionally, data archiving, access, continuity, and public engagement will need to be considered. The role of AI, particularly AI-driven sensor duty cycles and balancing science versus commercial priorities, will also be important factors to consider.

Main discussion points:

- It was noted there has been some discussion within the group for CEOS-ARD Precipitation specifications, and this could help respond to some of these questions.

### 7.11: GEOGLAM and Rapid Response for Food Security

Presenter: Ian Jarvis (GEOGLAM Project Office) [[presentation](#)]

Main points:

- GEOGLAM is establishing an agricultural centre with the aim to provide quick and effective agricultural assessments in response to urgent needs. It is policy-driven and flexible, and can be triggered by requests from ministries of agriculture, G20 AMIS (Agriculture Market Information System) Secretariat organisations, and international humanitarian organisations. The assessments can be pre-emptive or in response to emerging concerns.
- There are multiple opportunities for collaboration within the GEOGLAM community. The AMIS Secretariat and Steering Committee, as well as USAID, have expressed interest in collaboration through funding streams. The collaboration with the Disasters Center at the University of Strasbourg is already established. Additionally, there is strong interest from funding foundations and the GEOGLAM community.
- CEOS can support by recognising the critical importance of open data from public space agencies. When the rapid response process is triggered, CEOS can increase the priority of non-standard acquisition of public agency data products, such as SAR missions.
- CEOS can develop user agreements in advance where required, and support the development of EAV through ARD products to enable rapid response when needed. Furthermore, CEOS can help bridge data gaps by working with the commercial sector.
- GEOGLAM is keen to have CEOS-ARD that facilitates the production of the Essential Agricultural Variables.
- GEOGLAM has significant connections with the private sector including Planet, but is still seeking CEOS support for coordinating filling of data gaps by the commercial sector.

Main discussion points:

- Stephen Volz (NOAA) asked about the commercial sector filling gaps, and what help they are looking for. Ian Jarvis (LSI-VC GEOGLAM Subgroup) noted the arrangements are ad-hoc at the

moment, as the private sector is keen to help with this, due to the media attention it gains. The companies generally share data free of charge. If we are looking at more of an established facility, there could be challenges. The Planet agreement took a few months to get in place.

- Alex Held (CSIRO) expressed CSIRO's interest in the early warning angle and asked where CEOS can help. What is the latency time frame? Ian Jarvis (LSI-VC GEOGLAM Subgroup) responded that weeks to months is a good time frame, but that is still faster than we are able to do at this time. The crop monitor reports are now monthly. GEOGLAM is also now moving to seasonal climate outlooks.
- Mark Dowell (COM) said he understands the overall need for this type of service, but does the community have the capacity themselves to ingest this kind of data? This community is more used to the bulletin type of product.
- Ian Jarvis (LSI-VC GEOGLAM Subgroup, GEOGLAM Project Office) noted many of our users are sophisticated, e.g., FAO. A number of countries already have their own capabilities for this type of produce. GEOGLAM has also developed guidance for the community about how they work with their stakeholders.

### 7.12: Progress Report on the PM2.5 Roadmap

Presenter: Barry Lefer (NASA, AC-VC) [[presentation](#)]

Main points:

- Noted the endorsement by CEOS of the paper at the 2022 CEOS Plenary. The PM2.5 White Paper proposes 16 recommendations to improve satellite-based monitoring of PM pollution.
- The roadmap aims to coordinate efforts of remote sensing, modelling, and in situ monitoring communities, record progress in key developments, and develop use cases showcasing state-of-the-art implementations. An integrated approach will allow for better information.
- Use cases include integrating satellite-derived PM2.5 into EPA's AirNow System, CAMS air quality monitoring service, enhancing air quality decision-making in Indian megacities, and monitoring and forecasting air quality in Asia through NASA-USAID partnership.
- More information is available at <https://repository.library.noaa.gov/view/noaa/49032>.
- Highlighted the Thailand and India use cases, made possible through the NASA-USAID partnership.

## Session 8: CEOS Mini-Plenary

### 8.1: CEOS Mini-Plenary Topics

No topics were raised so this item was omitted.

### 8.2: Progress on CEOS Chair 2023 Priorities

Presenter: Pakorn Apaphant (GISTDA, CEOS Chair) [[presentation](#)]

Main points:

- The 2023 CEOS Chair priorities are:
  - o Supporting CEOS Preparations and Inputs to the Global Stocktake of the UNFCCC Paris Agreement
  - o Supporting Exploration of New Geometries for Space Agencies and CEOS with New Space
- To support the first priority, GISTDA organised a joint workshop with SilvaCarbon on the uptake of global AFOLU datasets. Key outcomes include improved awareness and understanding in

South-East Asia of the potential of global EO AFOLU datasets, enhanced capacity and skills among participants to use and apply AFOLU datasets and technologies, strengthened collaboration and partnerships among stakeholders and experts, and increased knowledge sharing of best practices and success stories related to AFOLU data and its applications.

- For the second priority, GISTDA have been working with the CEOS New Space Task team led by the SIT Chair to develop a New Space Economy document as a means for knowledge sharing with CEOS Agencies.
- The international seminar 'Shaping New Space Economy' was held on 16-17 March 2023 in Bangkok, Thailand. The key outcomes of this event include strengthened cooperation between Thailand and Japan in the new space economy, input from private companies and academia for the [New Space Task Team \(NSTT\) Activities Working document](#) and increased awareness and understanding of the new space economy.
- GISTDA is taking it upon itself as the CEOS Chair Agency to try and re-engage with CEOS Members and Associates that have been less active in CEOS recently. Letters were sent to the relevant agencies, and we have received a number of positive responses.
- GISTDA organised THEOS-3 seminar on Thai Space Ecosystem to foster cooperation between Thai space-related companies and stakeholders for THEOS-3 in-house development.

Main discussion points:

- Karen St. Germain (NASA) thanked Pakorn Apaphant (GISTDA, CEOS Chair) for this effort to re-engage less active CEOS members, and encouraged all to do the same.
- On behalf of CEOS, Pakorn thanked Ivan Petiteville (ESA, SIT Chair Team) for his many years of service. Simonetta Cheli (ESA, SIT Chair) also thanked Marie-Josée Bourassa for her years of service to CEOS.

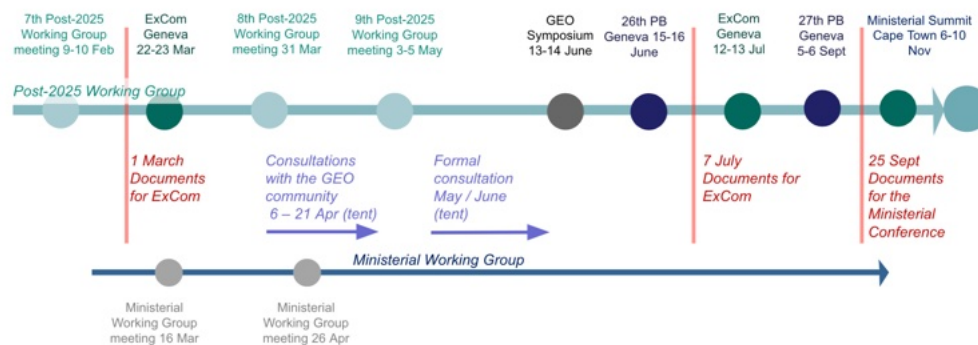
## Session 9: Other Business and Closing

### 9.1: Update from GEO Secretariat

Presenter: Laurent Durieux (GEO Secretariat), Andreas Obrecht (GEO Secretariat) [[GEO Post-2025 Strategy](#)] [[SDGs](#), [Biodiversity](#), [Wetlands](#), and [LDN](#)]

- A brief update on the status of the work of the GEO Post-2025 Working Group was given. This work will culminate in a draft strategy which will be sent for formal consultation.
- The GEO Post-2025 Value Proposition was presented:
  - o GEO's value proposition is to advocate for the use of Earth intelligence [and knowledge], lead and convene partners from across sectors and disciplines and throughout the Earth observation value chain to accelerate the co-design, co-creation and co-implementation of demand-driven, integrated, and innovative solutions for addressing global societal and environmental challenges.
  - o In doing so, the GEO community learns, shares knowledge, technology and resources, develops capacity and amplifies benefits and impact.
- GEO will coordinate its activities along the lines of the Earth observation value chain.

## Process leading to the Ministerial Conference



Laurent Durieux (GEO Secretariat) reported on GEO Work Programme activities relevant to CEOS:

- Four incubators are being developed: solutions supporting GEO Wetlands and ecosystem extent mapping; marine pollution; multi-hazards, wildfires and drought; and urban health.
- The Global Ecosystem Atlas is an open online resource to report on the state of ecosystem extent to prompt action to support biodiversity and inform nature-based solutions. The project was acknowledged by CBD Convention, and Ramsar for Wetlands.
- A global service urban heat and risk map to see how spatial information can be provided to cities to respond to that risk. Martyn Clark presented at the SDG Side Meeting on Tuesday with more details on this project.
- Laurent noted he will leave GEO Secretariat at the end of the month. However, he will continue his involvement in GEO Wetlands via appointment to STRP as Scientific Expert.

Main discussion points:

- Mark Dowell (COM) asked who will take over as the CEOS point of contact at GEO Secretariat. CEOS should pay attention to the reshaping of the foundational tasks of GEO, noting CEOS' past contributions to these tasks, and the proposed changes may have implications on how we are involved.
- Ivan Petiteville (ESA, SIT Chair Team) agreed with the need for a CEOS point of contact. As the direction of the GEO Secretariat develops, the priorities will become clearer. The CEOS approach has been to start with the UN conventions, participate in workshops, and agree resources and seek partner funding based on these efforts. This would be a good approach for CEOS to take to the incubators as well.

### 9.2: CEOS Systems Engineering Office Report

Presenter: David Borges (NASA, CEOS SEO) [[presentation](#)]

- A summary of the SEO fundamentals and related activities was presented. The fundamentals include maintaining the CEOS website and deliverables tracking infrastructure, CEOS Visualization Environment (COVE), inventories of Open Source Software and Future Data Architectures, the CEOS Training Calendar, support to EOTEC DevNet, the Open Data Cube (ODC), and the CEOS MIM Database Team support.
- SEO currently provides support to a large number of CEOS activities, all of which help to animate and progress tasks across the organisation, addressing CEOS-ARD, EAIL, the Ecosystem Extent Task Team, the interoperability framework, the New Space Task Team, and the SDG coordination group.
- The SEO is conducting a Cross-Cloud Comparison Study with the objectives of understanding quantitative and qualitative differences in performance from a user experience perspective and reducing barriers to entry. The goal is also to test new CEOS ARD datasets in various cloud



environments, and contributing to CEOS good practices around cloud search, discovery, access and exploitation.

- This year, the CEOS SEO team is supporting ARD 23, GEO Open Data Open Knowledge Workshop, IGARSS, and GEO Week 2023.

Main discussion points:

- Jonathon Ross (GA) thanked the SEO on behalf of GA for their key role within CEOS, as the SEO helps pull together numerous CEOS activities. He thanked NASA for supporting this key resource.
- Makoto Natsuisaka (JAXA, WGISS Chair) noted that the WGISS team used to have an interoperability data and use team, previously led by Rob Woodcock. Rob's departure has left a key gap, including the practical development of practices. SEO's continuation of this type of work through involvement in EAIL is critical.
- Stephen Volz (NOAA) noted the GEO Open Data Workshop is key to getting GIDTT on board, and CEOS can help provide guidance through this meeting with its own interoperability and ARD work.
- Alex Held (CSIRO) thanked SEO for supporting Earth Analytics Interoperability Lab (EAIL). He noted that in future, CSIRO hopes to provide the kind of capacity previously provided by Rob Woodcock.

### 9.3: CEOS Communications

Presenter: Libby Rose (CEOS SEO) [[presentation](#)]

- The current CEOS Communications Strategy was endorsed at the 2021 CEOS Plenary. The team has used this as a foundation to reinvigorate CEOS Communications during 2022, and has established a baseline of communications activities.
- Noted the aquatic carbon roadmap presentation yesterday with a stated objective: “to serve as an effective means for communicating our intentions to society”. This statement shows why CEOS Communications exists.
- 30 articles were posted over 2022, exceeding the target of 2 per month. The open data articles published early in 2022 were popular.
- The article written to announce the endorsement of the Aquatic Reflectance ARD Product Family Specifications received the highest number of views. The article was shared by CSIRO, which increased the reach of the article.
- The team is finding the current target audience as defined in the strategy too broad to make an impact, and propose to have two distinct audiences, internal CEOS and external EO and geospatial data communities. For each communications activity undertaken, the target audience will be defined clearly and precisely, to help focus the target for each piece.
- The membership of the CEOS Communications Team should also be revisited, to include support from any members of the CEOS community who have experience or interest in communications. Thank you to Chris Barnes (USGS) and Katy Matthews (NOAA) for offering their support.
- Welcome nominations from additional people for the Communications Team.
- Most CEOS Agencies have communications specialists within their Agencies, whose social media reach is often much broader than CEOS. The team would like to leverage this however possible, with the understanding some communications teams may have rigorous protocols and may not be able to help much.
- Libby noted an example of LSI-VC meeting announcement and retweeting by @ESA\_EO thanks to the efforts of Ferran Gascon (ESA), which saw a ten-fold increase in the reach of the tweet.

- In light of these points, the CEOS Communications Team would like to update the Communications Strategy, with endorsement targeted for CEOS Plenary 2023.
- If any working group or virtual constellation leads would like updates to be made to their webpage, they should contact Dave Borges ([david.borges@nasa.gov](mailto:david.borges@nasa.gov)), Matt Steventon ([matthew@symbioscomms.com](mailto:matthew@symbioscomms.com)), and/or Libby Rose ([libby@symbioscomms.com](mailto:libby@symbioscomms.com)).

Main discussion points:

- Ivan Petiteville (ESA, SIT Chair Team) noted the two types of audience: internal and the external EO and geospatial communities. He suggested that we could focus more broadly on the end user community. Libby noted we are still discussing how and who we want to capture from the EO community, and there is scope to define the audience in future.
- Jonathan Ross (GA) thanked Libby for the presentation. He noted that quite a lot of effort goes into drafting communications products, and he wondered how we can see greater impact. He noted the example of Tweets following the recent LSI-VC meeting. He suggested another action for CEOS Principals to engage their communications departments to help amplify content from official CEOS channels.
- Stephen Volz (NOAA) supported the communication strategy revamp and suggested engaging closely with the GEO communications team and Post-2025 Working Group to ensure close connection.
- Pakorn Apaphant (GISTDA, CEOS Chair) noted this is an important task for CEOS to ensure recognition of the work we are doing across the community and government. If these groups do not know what we are doing, it is much harder for them to engage and support. Every agency has its own communications team, and he agreed with Ivan that these teams should be engaged to amplify the message of CEOS.
- Flora Kerblat (CSIRO) noted the successful side event and noted that she has tried in CSIRO to have them more involved and promote what we are doing in CEOS. Note there are some constraints on CSIRO social media policy, for example in relation to re-Tweets where it is fine for individuals, but more difficult institutionally.
- Stephen Briggs (ESA, SIT Chair Team) suggested to target communities, three which are all quite overlapping/internal and there was a suggestion at looking at both internal/external. All very true, but it is not reasonable to ask the Communications Team to confirm the audience. Such guidance needs to come from CEOS Principals. It is Principal-level business. This group (SIT) needs to give better guidance to the Communications Team about who we are targeting. Information needs to be provided to them. The target audience impacts a lot of different decisions. Briggs suggested providing advice to help ease that.
- Ivan suggested this be covered in the revision of the CEOS Communications Strategy.

<b>SIT-38-06</b>	CEOS Agencies are invited to provide a point of contact to the SEO for coordination with the CEOS Communications Team, in particular on social media outreach.	<b>June 2023</b>
	<i>Rationale: The CEOS Comms team is working to improve outreach through redistribution of CEOS communications through individual agency channels</i>	
<b>SIT-38-07</b>	SEO to bring a updated CEOS Communications Strategy to CEOS Plenary 2023 for consideration	<b>Plenary 2023</b>
	<i>Rationale: The CEOS Communications Strategy is being updated as part of CEOS annual continual advancements in need of an update.</i>	

#### 9.4: Distinct Purposes for CEOS Meetings

Presenter: Ivan Petiteville (ESA, SIT Chair Team) [[presentation](#)]

- Following from an item in the SIT Chair Report for SEC-302, the SIT Chair proposes a discussion on the purpose for the main CEOS meetings:
  - **CEOS SEC** is ideally a forum for discussion to progress issues between major meetings (less reporting)
  - **CEOS SIT** is a Principal-level meeting to hear, discuss, coordinate, and agree requests for resources, with a focus on strategic guidance with regard to governance, stakeholders.
  - **SIT Technical Workshop** should be attended by technical experts and scientists focused on problem solving. The workshop should be used to prepare the necessary information to make appropriate decisions at the CEOS Plenary.
  - **CEOS Plenary** is for the broadest possible Principal-level participation, and decision making on all CEOS matters.
- Participants should discuss to ensure concurrence on these descriptions and develop approaches to ensure differentiation for 2023 and beyond.
- For a number of years (pre-COVID), the CEOS SIT Chair had hosted dedicated Virtual Constellation and Working Group sessions prior to SIT Technical Workshop. Virtual meetings didn't allow time for these important interactions, and several "Working Teams All Hands Calls" were held to mitigate the gap. Feedback is being sought from Working Groups and Virtual Constellations on how they would like to approach coordination. The feedback received so far has indicated that focused side meetings with dedicated topics, as is currently done, is more effective.

Main discussion points:

- Ivan Petiteville (ESA, SIT Chair Team) noted his imminent retirement from ESA, and the community thanked him for his many years of supporting CEOS through various roles.

#### 9.5: AOB

- None raised.

#### 9.6: Review of SIT-38 Session Outcomes and 9.7: Review of Draft Actions

Presenter: Stephen Ward (ESA, SIT Chair Team)

- The summary [presentation](#) highlights the main discussion points raised during the meeting.
- Reviewed the [draft actions](#) table.

Main discussion points:

- Stephen Volz (NOAA) noted on the communications plan action, Agencies should deliver guidance on the target audience. He suggested the action include a discussion point for the next CEOS Secretariat meeting to discuss the target audience for CEOS Communications.
- Mark Dowell (COM) asked about the GEOTREES action, noting that the Commission could utilise alternate resources to access research sites. This would involve approaching colleagues in other Directorates to see if they are willing to contribute, with particular focus on less developed countries. Simonetta noted that agencies have various mechanisms to support GEO-TREES activities and all options should be considered.

#### 9.8: Closing Remarks

Presenter: Simonetta Cheli (ESA, SIT Chair) [[presentation](#)]

- Noted the high volume of content presented and discussed over the last two days, covering a lot of key strategic issues.
- Thanked all CEOS Agencies for their contributions, and those who joined online.
- This meeting has demonstrated the critical role of the SIT Chair, as a significant milestone early in the year to set the course for Plenary later in the year.
- Thanked the ESA SIT Chair Team, in particular Tatiana Burukhina (ESA) for her excellent preparations for the meeting. A round of applause followed.
- The 2023 SIT Technical Workshop will be held on 17-19 October 2023, at ESA-ESRIN.

## APPENDIX A: Attendees

### SIT-38 Registered Participants List

**Bold** = confirmed attendee; \* = virtual participation

Agency/Organisation	Name	Agency/ Organisation	Name
AEM	<b>Adán Salazar Garibay*</b>	Innovation Agency Lithuania	<b>Eigirdas Sarkanas*</b>
AEM	<b>Adrian Guzman*</b>	ISRO	<b>Mini Raman*</b>
AEM	Rosa Ma Ramirez de Arellano y Haro*	ISRO	Muvva V. Ramana*
AIRCAS	Jing ZHAO	ISRO	<b>Nitant Dube*</b>
AIRCAS	<b>Wenjiang Huang</b>	ISRO	<b>Rajeev Jaiswal*</b>
Alma Mater Studiorum University of Bologna	<b>Duccio Rocchini*</b>	ISRO	<b>Rashmi Sharma*</b>
BOM	<b>Agnes Lane*</b>	ISRO	<b>Shyam Sundar Kundu*</b>
CEOS	<b>Marie-Claire Greening</b>	JAXA	<b>Hiroshi Murakami*</b>
CNES	<b>Aurélien Sacotte</b>	JAXA	<b>Makoto Natsuisaka</b>
CNES	<b>Aurelien Carbonniere</b>	JAXA	<b>Mariko Harada</b>
CNES	<b>Erwin Bergsma*</b>	JAXA	Michelle Piepgrass*
CNES	<b>Helene de Boissezon*</b>	JAXA	<b>Misako Kachi*</b>
CNES	<b>Raquel Rodriguez Suquet*</b>	JAXA	<b>Osamu Ochiai</b>
CNES	<b>Selma Cherchali</b>	JAXA	<b>Takeo Tadono*</b>
CNES	<b>Vincent Lonjou</b>	JAXA	Takeshi Hirabayashi
CNES/INRAE	<b>Sandra LUQUE</b>	JAXA	<b>Yuko Nakamura</b>
CONAE	<b>Laura Frulla</b>	JAXA/RESTEC	<b>Satoshi Uenuma</b>
Council for Scientific and Industrial Research (CSIR)	<b>Christo Peter Whittle</b>	JAXA/RESTEC	<b>Toshi Kamei</b>
CSA	<b>Eric Laliberté</b>	JAXA/RESTEC	<b>Yukio Haruyama*</b>
CSA	Marie-Josée Bourassa	JPL/California Institute of Technology	<b>Jorge Vazquez*</b>
CSIRO	<b>Alex Held</b>	NASA	Amanda Koltz
CSIRO	<b>Flora Kerblat</b>	NASA	<b>Argyro Kavvada*</b>
CSIRO	Shaun Levick*	NASA	<b>Barry Lefer</b>
DLR	<b>Albrecht von Bargaen*</b>	NASA	<b>Christine Bognar</b>
DLR	<b>Klaus Schmidt*</b>	NASA	<b>Christopher Kidd</b>
DLR	<b>Michael Nyenhuis*</b>	NASA	<b>David Borges</b>
ECMWF	<b>Vincent-Henri Peuch</b>	NASA	<b>Edward Armstrong*</b>
ESA	Alexis Sarraute	NASA	<b>Frederick Policelli*</b>
ESA	<b>Anatole Deligant</b>	NASA	<b>Gary Geller</b>
ESA	<b>Antonio Ciccolella</b>	NASA	Jack Kaye*
ESA	<b>Eleni Paliouras</b>	NASA	<b>Julie Robinson</b>
ESA	<b>Ferran Gascon</b>	NASA	<b>Karen St. Germain</b>
ESA	Frank Martin Seifert	NASA	Kimberly Hurst

ESA	<b>Ivan Petiteville</b>	NASA	<b>Lawrence Friedl*</b>
ESA	<b>Klaus Scipal*</b>	NASA	Mark Carroll*
ESA	<b>Marc Paganini</b>	NASA	<b>Nadya Vinogradova Shiffer*</b>
ESA	<b>Marie-Hélène Rio</b>	NASA	<b>Nancy D Searby*</b>
ESA	<b>Mirko Albani</b>	NASA	<b>Pamela Collins*</b>
ESA	<b>Paolo Castracane</b>	NASA	<b>Vardis Tsontos*</b>
ESA	<b>Philippe Goryl</b>	NASA	<b>Wenyng Su*</b>
ESA	<b>Simonetta Cheli</b>	NASA	<b>Yasha Moz*</b>
ESA	<b>Stephen Briggs</b>	NASA GSFC	Benjamin Poulter*
ESA	<b>Tatiana Burukhina</b>	NASA/COL/GOOS	Andrea McCurdy*
ESA	<b>Yasjka Meijer</b>	NASA/JPL	John Worden*
ESA SIT Chair Team	<b>George Dyke</b>	NASRDA	Matthew Adepoju
ESA SIT Chair Team	<b>Libby Rose</b>	NCEO (UKSA)	<b>John Remedios</b>
ESA SIT Chair Team	<b>Matthew Steventon*</b>	NOAA	<b>Charles Wooldridge</b>
ESA SIT Chair Team	<b>Stephen Ward</b>	NOAA	<b>Jeff Privette*</b>
EUMETSAT	<b>Jörg Schulz</b>	NOAA	<b>Katy Matthews*</b>
EUMETSAT	<b>Robert Husband*</b>	NOAA	Kenneth Casey*
European Commission (COM)	<b>Astrid Christina Koch*</b>	NOAA	<b>Merrie Beth Neely*</b>
European Commission (COM)	<b>Jean-Christophe Gros</b>	NOAA	<b>Paul DiGiacomo*</b>
European Commission (COM)	<b>Joana Melo*</b>	NOAA	Shobha Kondragunta*
European Commission (COM)	<b>Luca Fasano*</b>	NOAA	<b>Stephen Volz</b>
European Commission (COM)	<b>Mark Dowell</b>	NOAA/NCEI	Nancy Ritchey*
European Commission (COM)	<b>Peter Strobl</b>	NOAA/NESDIS	<b>Tyler Christensen</b>
European Commission (COM) - DG DEFIS	Michael Rixen*	NSMC/CMA	<b>Di Xian</b>
GEO SEC	<b>Andreas Obrecht*</b>	NSMC/CMA	<b>Jinlong Fan</b>
GEO	<b>Laurent Durieux</b>	Portuguese Space Agency	<b>Carolina Sá*</b>
GEO	Martyn Jonathan Clark*	SEO/Killough Services	<b>Brian Killough</b>
GEOGLAM	<b>Ian Jarvis</b>	UK National Centre for Earth Observation	<b>Svetlana Zolotikova*</b>
Geoscience Australia	<b>Andreia Siqueira</b>	UK/DEFRA	<b>Oliver Vaughan</b>
Geoscience Australia	<b>Jonathon Ross</b>	UKSA	<b>Beth Greenaway*</b>
Geoscience Australia	<b>Maggie Arnold*</b>	UNOOSA	<b>Aline Souza*</b>
GISTDA	<b>Atipat Wattanuntachai</b>	UNOOSA	<b>Jorge Del Rio Vera*</b>
GISTDA	<b>Miss Nitiwadee Saengsuwan</b>	USGS	<b>Roger Sayre*</b>
GISTDA	Nuttavipa Thanthawewut*	USGS	<b>Steve Labahn</b>
GISTDA	<b>Pakorn Apaphant</b>	USGS	<b>Timothy Newman</b>
GISTDA	<b>Paromet Thuwakhom</b>	USGS	<b>Timothy Stryker</b>
GISTDA	<b>Sutinee Sibirunwong</b>	USGS	<b>Tom Sohre</b>

GISTDA	Tanita Suepa	USGS/Aerospace Corporation	<b>Steven Covington</b>
GOOS/IOC/UNESCO	<b>Emma Heslop*</b>	WMO	<b>Heikki Pohjola</b>
INGV	<b>Stefano Salvi</b>	WMO	<b>Lars Peter Riishojgaard</b>

## APPENDIX B: Decisions and Actions Record

### ACTIONS

SIT-38-01	OCR-VC to liaise with SIT Chair to provide an assessment of the resources and estimated time horizon needed from the relevant CEOS agencies to undertake development of the Aquatic Carbon Roadmap following the proposal presented at SIT-38 by OCR-VC. SIT Chair will support communication of the request(s) to CEOS Principals.	<b>May 2023</b>
	<i>Rationale: OCR-VC will need additional support to undertake the proposed Aquatic Carbon Roadmap. SIT Chair will help determine whether the necessary support is available from CEOS agencies.</i>	
SIT-38-02	CEOS Principals whose agency is not already contributing to the work of the Joint CEOS-CGMS WGClimate are asked to consider nominating an agency representative.	<b>May 2023</b>
	<i>Rationale: The WGClimate has made known that it needs broader representation and support from CEOS Agencies to accomplish the WG objectives.</i>	
SIT-38-03	CEOS Agencies to consider whether they might support GEO-TREES through the sponsorship of one or more validation sites. Interested Agencies are asked to follow up to <a href="#">Klaus Scipal</a> of ESA.	<b>Plenary 23</b>
	<i>Rationale: GEO-TREES has sponsorship for only a handful of the targeted 100 sites and seeks to add more sites to the network in support of impactful biomass data from CEOS missions</i>	
SIT-38-04	CEOS Agencies invited to comment on the New Space Task Team (NSTT) Paper ahead of the next Team call (last week of April or first week of May)	<b>14 April 2023</b>
	<i>Rationale: In light of SIT-38 discussions, further reactions and refinements are invited on the NSTT paper</i>	
SIT-38-05	There is an open call for CEOS Agencies to consider nominating a Vice-Chair for WGCapD. The current Vice Chair from SANSA will become WGCapD Chair at the close of 2023 CEOS Plenary	<b>Plenary 2023</b>
	<i>Rationale: All CEOS Working Groups needs both a Chair and Vice-Chair to operate effectively and to assure continuity of leadership for activities.</i>	



<b>SIT-38-06</b>	CEOS Agencies are invited to provide a point of contact to the SEO for coordination with the CEOS Communications Team, in particular on social media outreach.	<b>June 2023</b>
	<i>Rationale: The CEOS Comms team is working to improve outreach through redistribution of CEOS communications through individual agency channels</i>	
<b>SIT-38-07</b>	SEO to bring a updated CEOS Communications Strategy to CEOS Plenary 2023 for consideration	<b>Plenary 2023</b>
	<i>Rationale: The CEOS Communications Strategy is being updated as part of CEOS annual continual advancements in need of an update.</i>	

## DECISIONS

<b>DECISION 01</b>	Accepted the nominations of two additional co-leads for the Ecosystem Extent Task Team (EETT) from CSIRO (Shaun Levick) and USGS (Roger Sayre) to join Gary Geller (NASA) and Sandra Luque (CNES) as Co-leads.
<b>DECISION 02</b>	Agreed to an extension until the 2023 CEOS Plenary for the Oceans Coordination Group to finalise the proposed way forward.
<b>DECISION 03</b>	Agreed to extend until the October 2023 SIT Technical Workshop the deadlines for Actions 36-10 and 36-11 from 2022 CEOS Plenary, in relation to an interoperability framework from WGISS and volunteers from CEOS agencies to contribute.
<b>DECISION 04</b>	With the extension of EOTEC DevNet, the SEO confirmed continued support of existing hazard (Flood, Drought) trackers, website content maintenance and associated communications needs.