

CEOS Satellite Data Supply Strategy for United Nations Sustainable Development Goals (SDG)

Document prepared by SIT Chair team and SDG AHT co-leads Marc Paganini (ESA), Alex Held and Flora Kerblat (CSIRO), SEO Brian Killough (NASA), supported by EO4SDG (GEO) Argyro Kavvada (NASA)

Draft prepared for CEOS Community ahead of SIT-35, March 2020

Version 1 April 2020

Version 2 End May 2020 – reflecting the “4 sub teams” to include the 4th one on 14.1.1 and other secondary deliverables

Version 3 as of 15 June 2020 - finalisation

This document outlines the key roles and responsibilities that CEOS (Committee on Earth Observation Satellites) plays, as a ‘space data enabler’, to facilitate access and use of publicly-funded satellite data, and assist countries embracing EO solutions into their national systems and processes in relation to their engagement on the 2030 Agenda on Sustainable Development. The CEOS remit on SDGs is fully embedded in the GEO Federated approach on SDGs and related workflows.

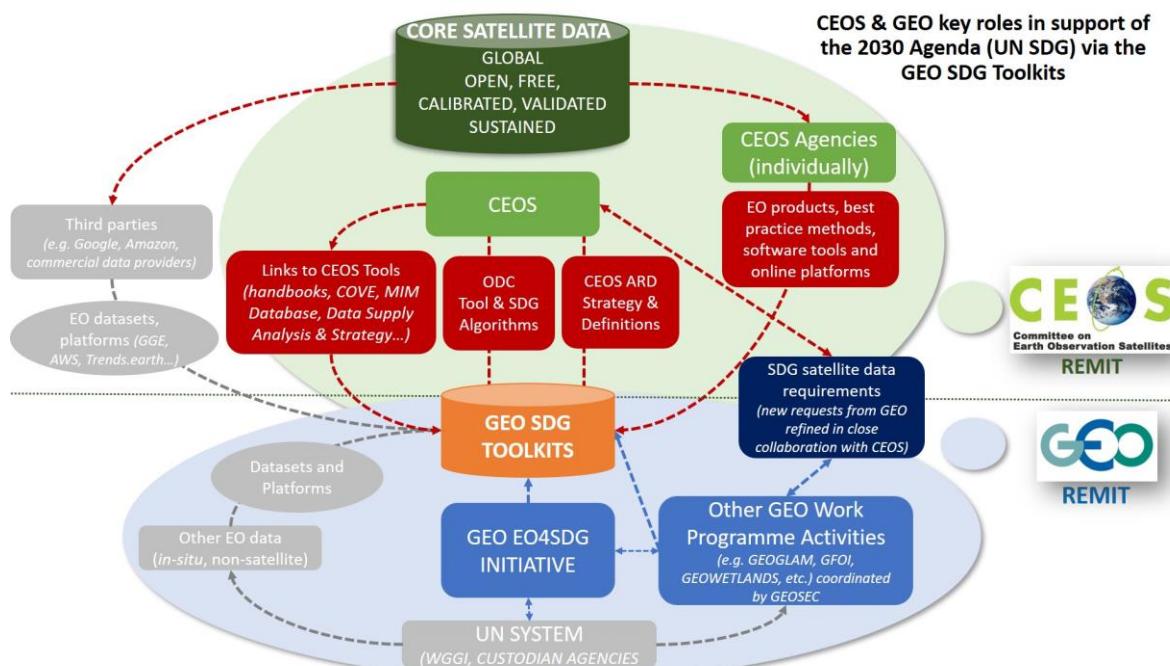


Figure 1: Version as of 25th March 2020

Broadly CEOS has the following roles and activities in support of the UN SDG process:

- CEOS coordinates civilian Earth observation satellite missions operated by their member agencies, and improves satellite data access and utility for public good world-wide.
- CEOS needs to ensure that suitably identified core satellite datasets are accessible and used for SDG planning, monitoring, assessment and reporting, and continue to be acquired in a consistent and continuous manner, and made easily and openly accessible to national governments and agencies.
- CEOS is a critical part of the GEO federated approach on SDGs. CEOS responds to satellite data requests from GEO EO4SDG and other GEO flaships, initiatives and communities active on SDGs.
- CEOS decides to focus on satellite data supply for 4 (3 primary indicators + 1 on coastal pollution) SDG indicators:
 - 6.6.1 (Water): Change in the extent of water-related ecosystems over time
 - 11.3.1 (Urbanization): Ratio of land consumption rate to population growth rate
 - 14.1.1 (Coastal pollution): Index of coastal eutrophication and floating plastic debris density *[newly added to the list due to its progress with GEO]*
 - 15.3.1 (Land): Proportion of land that is degraded over total land area

To better streamline our activities, the SDG AHT has recently decided to create 4 sub-teams in relation to these indicators (3 under the AHT, and the one on 14.1.1 will be overseen by COAST as a pilot project). Interested Agencies have been invited to nominate individuals to co-lead or actively contribute to these teams. Terms of Reference have been designed to support their work and objectives to be met until the Plenary.

Noting that GEO communities are also and already looking into additional specific indicators (eg. GEOGLAM on SDG 2 sustainable agriculture, or GFOI on forest monitoring). So, over time more indicators shall be addressed, as CEOS agencies express their interest and capability to pursue the coordination of EO data acquisition and supply.

- To facilitate the adoption of EO solutions by countries and their use in national SDG monitoring and reporting, CEOS Agencies are strongly encouraged to supply their satellite data in CEOS-agreed ARD formats, across land, marine and atmospheric domains.

To summarize, we have identified some key areas of CEOS to support SDG:

- **Analysis of satellite data supply from CEOS core missions** for the primary SDG indicators, which includes identification of observation gaps and solutions to be proposed and discussed with relevant CEOS Agencies
- **Increased ARD-products provided by Agencies** according to CEOS standards

- CEOS and CEOS Agencies contributions to the **GEO SDG EO Toolkits development** for the 4 primary SDG indicators:
 - Provision of CEOS-developed ARD standards and coordination,
 - methodological guidelines and best practices,
 - EO enabling infrastructures (e.g. jupyter notebooks for Open DataCube) and EO Quality Standards

Other “secondary” activities or deliverables may be led through – depending on CEOS Agencies engagement, such as:

- **Capacity Building** support on advanced satellite-based methodologies for the three primary SDG indicators.
 - Technical documentation: "technical guidance document" and "step-by-step procedure documents" to support countries to handle and process the satellite date for SDG indicators

Core Satellite Missions

From a CEOS perspective, we decided to give priority to free, open, global and sustained CEOS satellite missions, which are the principal sources of EO data for the SDGs. However, the final decision on which satellite data to use lies with the countries and SDG stakeholders, which can decide to use other regional or restricted satellite missions for their own applications.

We chose to not include in details any commercial missions (outside of CEOS scope) or high-resolution missions (all restricted), but clearly mention that some other relevant missions might exist to meet specific requirements (eg. Pacific Island nations may be interested in high-resolution data, but other stakeholders will be best placed to inform and deliver such products).

Next steps

We plan to make this list of CEOS core missions fully available, and help make these datasets more accessible to SDG users, via the GEO Toolkit.

CEOS ARD Products

CEOS will not create any specific “SDG-ARD product” given that the CEOS ARD Strategy focuses on delivering a product that suits a ‘majority of end-users’. CEOS will provide SDG users with a clear and easy access to all CEOS ARD products, starting with those related to the three primary SDG indicators.

Next steps

SDG-AHT (with the support of SEO and LSI-VC) to make strong linkages with GEO (GEO EO4SDG and GEO thematic initiatives) to advance on CEOS ARD for land (CARD4L) and make it used by SDG stakeholders.

We will closely follow CEOS developments related to in-land water, coastal and marine ARD products that could be suitable to any SDG applications or indicators.

SDG Satellite Requirements

We have worked on SDG Requirements templates, using several resources, and can now present a simple approach for the majority of end-users to avoid complexity. Thanks to SEO's support, we have also matched those requirements to the mission classes.

Next steps

We plan to agree on these requirements at SIT-35 (side-meeting), so we can share it with the wider CEOS and GEO communities to improve the document. To sustain and execute this strategy, CEOS through the Ad-Hoc team will maintain direct liaison across CEOS and with relevant GEO teams, run regular meetings to track progress, and to actively help GEO to fill in new requirements on a case-by-case basis (when a new user community expresses the needs), provided CEOS has the capacity to provide the necessary technical expertise.

The Satellite Data Requirements in each sub-team will be refined until SIT TW (September) based on user feedback, and be made available to GEO SDG Toolkits as a first baseline. The Requirements are not fixed (they evolve based on the needs and availability of data), shall be reviewed when necessary.

CEOS SDG contributions to GEO SDG Toolkits

The CEOS SDG-AHT has been actively supporting GEO in designing the strategic “Federated Approach” and the “SDG Toolkits” concepts including possible CEOS contributions.

Given CEOS is the “Space arm” of GEO, the SDG AHT has proposed to focus on “delivering data”, ensuring data access is facilitated, in adequate format (ARD as much as possible) to increase satellite data uptake for SDG monitoring and target achieving.

A list of possible contributions from CEOS has been established to help guide the SDG AHT to support the SDG Toolkits (available on the next page).

Proposed CEOS contributions to the GEO SDG Toolkits

1. Dataset Access (core datasets listed in requirements table) could include:

- a “best” (*easiest?*) link for data access for downloading,
- the location of datasets in cloud services (core data or mirrored archive - Google, Amazon)

2. List of Global Reference Products

Start from the existing ESA "EO Support Sheet" documents as they contain a comprehensive list of global reference data products

3. List of Tools and Services

- Review ESA "EO Support Sheets" for each SDG to include tools and services listed
- ODC algorithms (via Jupyter notebooks) and associated documentation and training
<https://www.opendatacube.org/>
- DIAS cloud services for Copernicus:
 - Creotech (PL) with cloud provider CloudFerro (PL): <http://www.creodias.eu>
 - Serco (IT) with cloud provider OVH (FR): <http://www.onda-dias.eu>
 - Airbus (FR) with cloud provider Orange (FR): <http://www.sobloo.eu>
 - ATOS (FR) with cloud provider T-Systems (DE): www.mundiwebservices.eu
 - EUMETSAT, with Mercator Ocean and ECMWF: <http://wekeo.eu>
- US Data portal on water <https://www.data.gov/climate/water/> (6.6.1 - many products and services)
- Trends.Earth (11.3.1): <http://trends.earth/>
- U-TEP Visualisation and Analytics Toolbox and TimeScan On-Demand (11.3.1):
<https://urban-tep.eu/>
- U.S. Climate Resilience Toolkit (6.6.1): <https://toolkit.climate.gov/topics/coastal/sea-level-rise>

4. Links to other existing CEOS products and tools such as

- MIM Database: <http://database.eohandbook.com/>
- COVE: <https://ceos-cove.org/>
- EO Handbook on SDG: <http://eohandbook.com/sdg/>