

# **CEOS Systems Database Overview**

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**(SEO)**

# Systems Database Summary

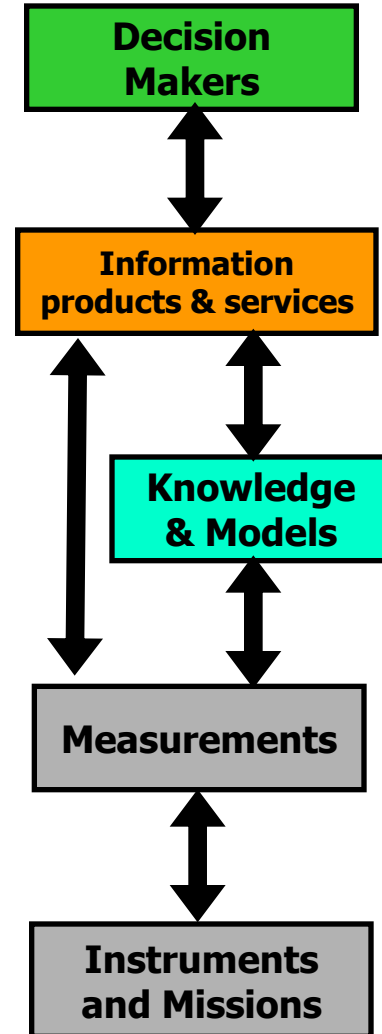
## Purpose

- Capture the space-based measurement requirements driven by science, applications, and decision makers and compare them with the space-based measurement capabilities of CEOS to determine measurement and time gaps and identify potential collaborative opportunities for CEOS long-term strategic planning.

## Approach

- Database tool developed in MS-ACCESS and My-SQL and hosted by the SEO website.
- Utilizes instrument types and measurement nomenclature consistent with the WMO report developed by Bizzarro Bizzarri (Space Based Global Observing System in 2009).
- Utilizes data from the "CEOS Database of Missions Instruments and Measurements" on which the EO handbook is based including SEO-added updates.
- Includes links to CEOS constellations, GEO SBAs and GCOS ECVs.
- Pre-defined tables of yearly mission counts by CEOS Constellation, GEO SBA, and GCOS ECV.
- Alphabetical menu list of CEOS assets by mission, instrument and measurement including additional mission details.

Societal Benefits



# www.ceos.org – SEO/Systems Database

## Mission Count tables by Constellation, SBA or ECV

**SEO Menu**

- CEOS Home
- SEO Home
- Contacts
- Constellations
- Systems Database
- Studies & Assessments

### Systems Engineering Database

The systems engineering database was designed to capture the space-based measurement requirements driven by decision-makers, applications and science to compare them with the measurement capabilities of CEOS. Resulting measurement and time gaps will help to identify potential collaborative opportunities for CEOS long-term strategic planning. Populated with data from ESA's EO Handbook and additional CEOS Constellation and GEO SBA content, the tool plans to include pre-defined and user-defined queries and reports using a systems architecture. The SEO envisions this tool will support the GEO Communities of Practice, CEOS Constellations, CEOS SIT leadership, and CEOS agencies.

**Mission / Instrument / Measurement Summary**

An alphabetical list of CEOS assets by mission, instrument and measurement including additional details in each category.

**Visualization Tool**

A Google-based visualization tool for the display of CEOS mission coverage tracks and ground-based assets.

**NOTE:** The data in the systems engineering database is considered "PRELIMINARY". Validation of measurement connections to instruments and missions has not been reviewed by every space agency. In addition, the SEO has added additional content that is not part of the current EO Handbook. The use of this data should be for "preliminary" studies or assessments. Future updates will aim to improve the accuracy of the data so that users can benefit from the data, determine potential measurement gaps, and develop improved long-term strategic plans.

**Mission/Measurement Timeline Tables**

Mission-count tables by year for each Virtual Constellation, GEO SBA and GCOS ECV. Click on any number in the tables to reveal detailed mission and instrument information.

**Virtual Constellations**

- [Atmospheric Composition](#)
- [Land Surface Imaging](#)
- [Ocean Colour Radiometry](#)
- [Ocean Surface Topography](#)
- [Ocean Surface Vector Winds](#)
- [Global Precipitation](#)

**GEO Societal Benefit Areas (SBA)**

- [Disasters](#)
- [Ecosystems](#)
- [Energy](#)
- [Climate](#)
- [Water](#)
- [Weather](#)
- [Ecosystems](#)
- [Agriculture](#)
- [Biodiversity](#)

**GCOS Essential Climate Variables (ECV)**

- [Aerosol Properties](#)
- [Albedo](#)
- [Biomass](#)
- [Carbon Dioxide, Methane and GHGs](#)
- [Cloud Properties](#)
- [Earth Radiation Budget](#)
- [FAPAR](#)
- [Fire Disturbance](#)
- [Glaciers, Ice Caps, and Ice Sheets](#)
- [LAJ](#)

Total Measurements: Geo-Mission/Instrument/Region	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Albedo of the Earth's surface	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Biomass	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Category architecture: core	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FAPAR	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fire area	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fire radiative power	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fire vegetation (terrestrial climate)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fraction of Vegetated land (veg cover)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Global cover	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Land cover	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Land cover type	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Land surface imagery	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Land surface temperature	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Land surface water	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Leaf area index (LAI)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Normalized Difference Vegetation Index (NDVI)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Photosynthetically active radiation (PAR)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Soil moisture	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Soil temperature	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Soil type	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vegetation type	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

**Recent News and Events**

- [CEOS Newsletter #32](#)  
February 2009
- [CEOS Flyer for GEO-6](#)  
November 2008
- [CEOS Brochure](#)  
October 2008

**CEOS Systems Engineering Database**

Home Page | Missions | Instruments | Measurements | Future Page

The CEOS Systems Engineering Office (SEO) systems database was designed to capture the space-based measurements required by decision makers, applications and science to perform gap analysis against current and planned CEOS missions. Resulting measurement and time gaps will help identify potential collaborative opportunities for CEOS long-term strategic planning. Populated with data from ESA's EO Handbook and additional CEOS Constellation and GEO SBA content, the tool uses a combination of pre-defined and user-defined queries and reports. The SEO envisions this tool will support the GEO Communities of Practice, CEOS Constellations, CEOS SIT leadership, and CEOS agencies.

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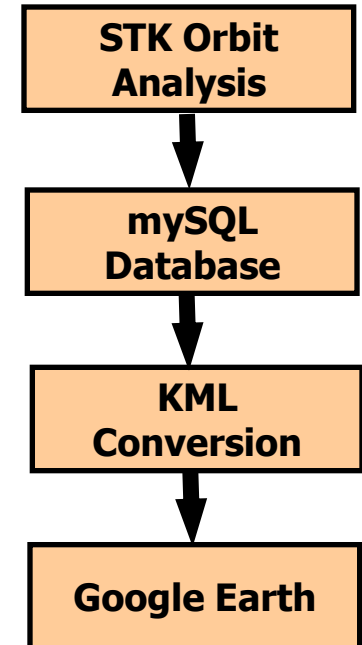
CEOS Systems Engineering Office (SEO)

**Visualization Tool on following charts**

# Systems Database - Future Plans

- Enhanced web interface and systems database navigation
- Additional pre-defined queries for Constellations, SBAs and ECVs
- User-defined query capability linked to My-SQL
- Data content authentication for Constellations, SBAs and ECVs
- Desire to update the content of the “CEOS Database of Missions and Instruments” to correct missing and incorrect CEOS agency information.
- Integration with the “CEOS Database of Missions and Instruments” to improve data sharing. Consider consistent nomenclature for instrument types and measurements.
- Develop web-based tools to display results of CEOS “threads” analyses.
- Work with GEO UIC (Lawrence Friedl) to develop an approach for displaying results of the SBA metadata analyses.

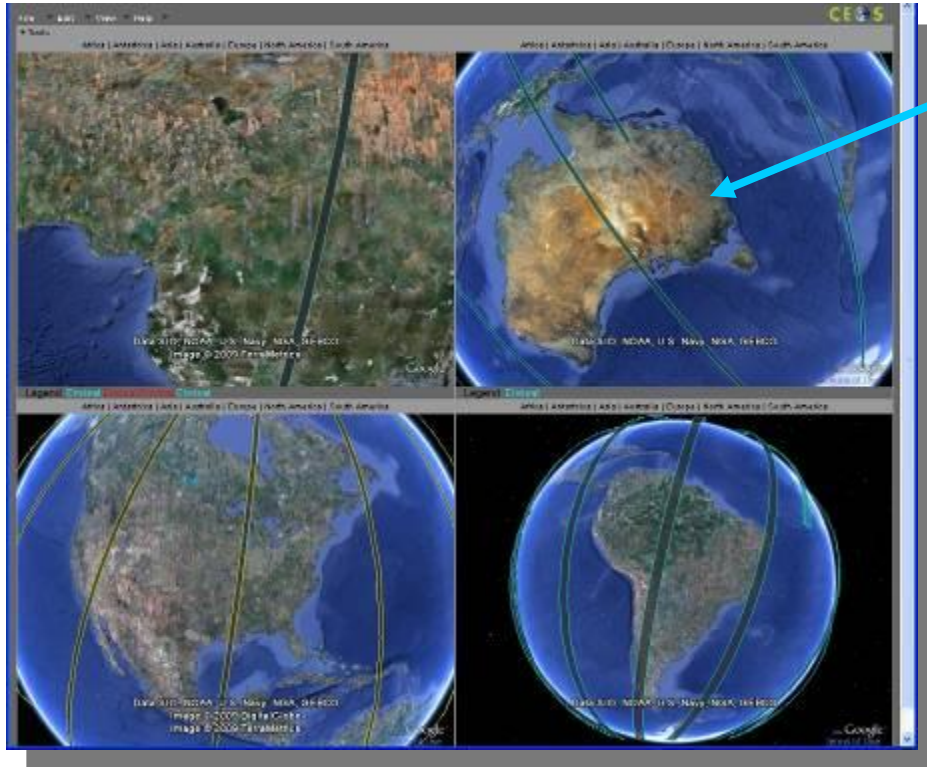
# CEOS Visualization Environment (COVE)



## Purpose

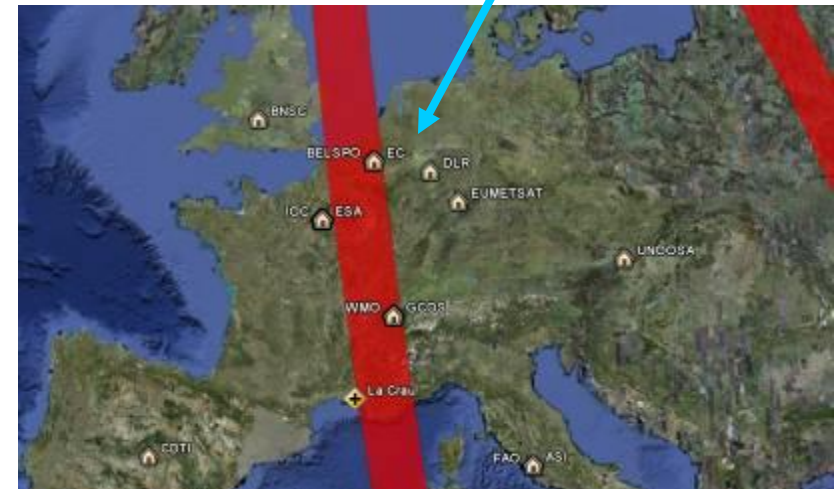
- Display orbit and measurement coverage of CEOS missions on a Google-Earth map.
- Support evaluation of data availability for GEO Societal Benefit Areas (SBA) in any location.
- Support calibration (on-orbit and ground) opportunities for CEOS missions.
- Use for education and capacity building.

# CEOS Visualization Environment (COVE)



**View multiple data sets on multiple viewports with zoom capability**

**Add background KML data such as CEOS agency locations or Cal-Val sites.**



## Functionality

- Full Google-Earth tool capabilities (zoom, rotation, country labels).
- User friendly GUI interface for selecting missions, instruments and measurements.
- Upload capability for personalized KML files (i.e., CEOS agencies, WGCV ground sites)
- Prototype version includes 4 missions (GoSat, Envisat, Landsat-7, Sentinel-2)

**DEMO**

## COVE – Future Plans

- Any future improvements or applications will require that the tool remain SIMPLE and INTUITIVE.
- The current tool is only a prototype to demonstrate capability and was developed in 8 weeks. Additional work is needed on the GUI interface and data displays for full functionality.
- The SEO would like a small set of users to test the system to determine potential CEOS applications. Contact the SEO for a username and password.
- There is a great potential to support CEOS Working Groups or Constellations. For example, WGCV would like to support mission cross-calibration by identifying coincident scene locations in a given date range for a given set of instruments.