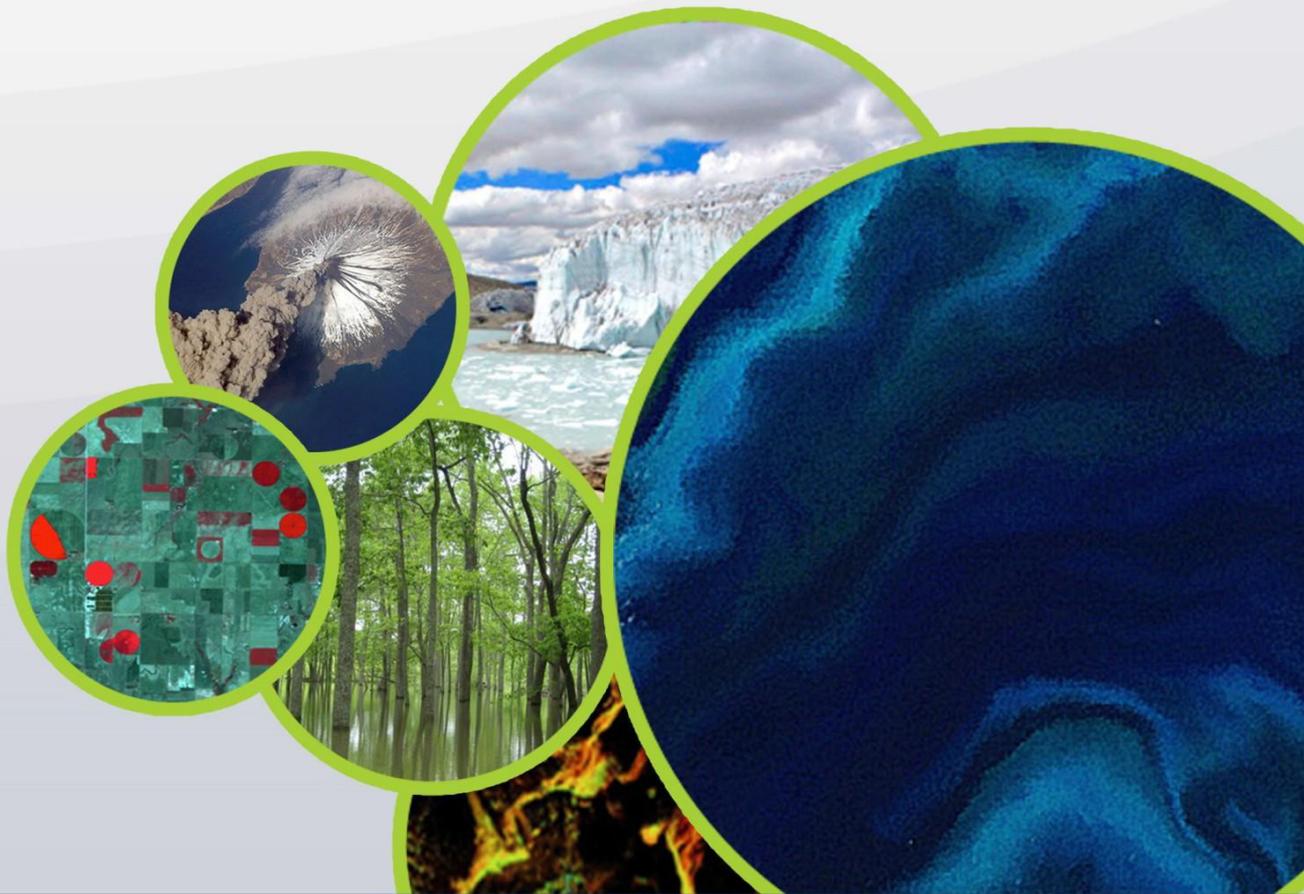




Committee on Earth Observation Satellites



Working Group on Calibration and Validation

## CEOS WGCV Terms of Reference

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Signed                    Philippe Goryl (ESA / Chair WGCV)  
                                  Cody Anderson (USGS / Vice-Chair WGCV)

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Change record

Date	Version	Pages	Description	who
10.03.2016	0.1	all	Totally new	Chair/Sec
17.03.2016	0.2	all	Re-phrasing	Vice-Chair
18.03.2016	0.3	all	Inclusion of discussion outcome during WGCV 40	All
21.03.2016	0.4	all	Consolidation of Version 0.3 in phrasing	Chair, M. Thankappan (GA)
04.05.2016	0.9	all	Consolidation of feedback to final draft for confirmation by CEOS WGCV	All / Chair
01.06.2016	0.9	all	Acceptance of final draft for approval by CEOS Plenary	CEOS WGCV
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15.11.2022	1.1	Page 6	Updated voting procedure for nomination of Vice Chair consistent with WGCV-51 proceedings (Decision 01 and Action WGCV-51-ACT-03)	CEOS WGCV
30.11.2022	1.1	Page 6	Approval by CEOS Plenary	CEOS Plenary

## 1 Mission and Objectives

### 1.1 Mission

The CEOS Working Group on Calibration & Validation (WGCV) Mission is to ensure long-term confidence in the accuracy and quality of satellite-based Earth Observation data and products and provide a forum for the exchange of information about calibration and validation and associated coordination, and cooperative activities.

Calibration is the process of quantitatively defining a system's responses to known, controlled signal inputs. Validation, on the other hand, is the process of assessing, by independent means, the quality of the data products derived from those system outputs.

The CEOS WGCV addresses the need for standardized ways of combining data from different sources to ensure interoperability among existing and future Earth Observing systems and promotes the international exchange of technical information and documentation, joint experiments, and the sharing of facilities, expertise, and resources. The CEOS WGCV is to be recognized as the first CEOS point of contact for the international user-community as far as Cal/Val, system technical information and Earth Observation quality processes are concerned. To this end, the CEOS WGCV addresses the need to standardize ways of combining data from different sources to ensure the interoperability required for the effective use of existing and future Earth Observation systems.

### 1.2 Objectives

The objectives of the CEOS WGCV are to enhance coordination and complementarity, to promote international cooperation and to focus activities in the calibration and validation of Earth Observations for the benefit of the CEOS membership, the Group on Earth Observation (GEO), and the international user community.

Specific objectives include:

- **Sensor-specific calibration and validation**  
to document and establish forums for the assessment, recommendation and implementation of current techniques and standards for pre- and post-launch characterization, calibration and validation.
- **Bio-geophysical validation**  
to document and establish forums for the assessment, recommendation and implementation of techniques for validation of bio-geophysical parameters derived from EO satellite systems.

Meeting these objectives within the context of calibration and validation includes the promotion of:

- The exchange of Earth Observation data, technical information and documentation.
- The investigation of possibilities for technical coordination and cooperation for space and ground segments.
- The coordination and analysis of Cal/Val campaigns and programs, optimizing and sharing of available facilities, expertise and resources as appropriate.
- The agreement of common terminology and definitions.

### 1.3 References and Abbreviations

The Terms of Reference are governed by the CEOS governance and process papers which are summarized in the following list of references:

## **References**

- [1] CEOS, Working Groups Process Paper, 5/2014.
- [2] CEOS, Governance and Processes, 11/2013.
- [3] CEOS, Chair Terms of Reference, 11/2013.
- [4] CEOS, CEOS Executive Officer (CEO) Terms of Reference, 11/2013.
- [5] CEOS, New Initiatives Process Paper, 5/2014.
- [6] CEOS, Secretariat Terms of References, 11/2013.
- [7] CEOS, Strategic Guidance, 11/2013.
- [8] CEOS, Strategic Implementation Team (SIT) Terms of Reference, 11/2013.
- [9] CEOS, System Engineering Office Terms of Reference, 11/2013.
- [10] CEOS, Terms of Reference, 11/2013.
- [11] CEOS, Virtual Constellations Process Paper, 11/2013.
- [12] CEOS, Work Plan, 2015 - 2017.

## **Abbreviations** used in the document:

Cal/Val	Calibration and Validation
CEO	CEOS Executive Officer
CEOS	Committee on Earth Observation Satellites
SEC	Secretariat
SEO	Systems Engineering Office
SIT	Strategic Implementation Team
ToR	Terms of Reference
VC	Virtual Constellation
WG	Working Group
WGCV	CEOS Working Group on Calibration and Validation

## 2 Governance

The governance of CEOS WGCV describes the membership and lead of CEOS WGCV.

### 2.1 Membership

CEOS Working Group membership as defined in [1] and [2], and members can be taken from all CEOS Agencies (Members and Associates). CEOS WGCV membership is defined in like fashion and CEOS WGCV members<sup>1</sup>, that can include delegations and nominated experts, shall be announced from CEOS members and associate members to the Co-chairs of CEOS WGCV for inclusion in the CEOS WGCV membership listings (detailed in the CEOS WGCV work plan). A CEOS Agency's contact will be included in the correspondence if no dedicated delegate has been nominated.

### 2.2 Lead

The lead of a CEOS Working Group is also governed by [1]. In addition, the Chair's sponsoring CEOS member provides a secretariat to maintain the day to day activities of the CEOS WGCV.

#### 2.2.1 Chairs' Responsibility

The CEOS WGCV chair and vice chair have the responsibility to communicate information and direction from CEOS leadership which includes information from the CEOS Plenary, CEOS Executive Office, CEOS Secretariat (SEC), and the CEOS Strategic Implementation Team (SIT) to all CEOS WGCV members.

The CEOS WGCV chair/vice chair/secretariat will provide a draft of the minutes (including deliverable status) and actions from a CEOS WGCV plenary meeting to meeting attendant within one week after the close of the meeting. A CEOS WGCV member may propose changes to the minutes with the chair/vice chair/secretariat making appropriate changes in consultation with the member. The minutes and actions are considered finalized and agreed upon by the meeting participants when no comments or requested changes are received for a two-week period. The finalized minutes and actions will be made available to all CEOS WGCV members via the CEOS web pages to all CEOS WGCV members no more than 30 days after the close of the meeting.

The CEOS WGCV sub-bodies chairs / vice-chairs are responsible to communicate minutes of their meetings, including deliverable status and actions, in the manner described above to the CEOS WGCV chairs who will make the sub-body meeting minutes available to the WGCV plenary.

Any key highlights or issues that WGCV members and sub-body chairs deem to be relevant to the CEOS SEC or CEOS SIT should be provided to the WGCV chair or vice chair on an "as needed basis" but no less than one week prior to a CEOS SEC or CEOS SIT meeting. Dates of these meetings are designated by the CEOS calendar or as communicated by the chairs. This information will be used by the CEOS WGCV chair/vice chair to report to CEOS plenary, CEOS SEC, or CEOS SIT as appropriate. These highlights and or issues will be noted as appropriate for potential CEOS newsletter incorporation.

The CEOS WGCV Chair is responsible for maintenance of the work plan and updates to the CEOS WGCV web page on the CEOS web portal. Modifications to the work plan will be made in consultation with the chairs of sub-bodies who will provide appropriate input to the work plan at the request of the CEOS WGCV Chair.

The Chair will name and support the CEOS WGCV secretariat that will assist the Chair in fulfilling the above responsibilities and other day-to-day activities of CEOS WGCV. An appropriate transition

<sup>1</sup> Note that the term „WGCV member“ in the ToR of CEOS WGCV encompasses both CEOS Agencies Members and Associates.

debrief between incoming and outgoing chairs including their secretariats shall ensure the continuity in work and its maintenance and documentation of the CEOS WGCV.

### 2.2.2 Nomination of Vice-Chair

The Vice-Chair will be nominated according to [1] every two years by CEOS WGCV. The nominated Vice-Chair will be presented to CEOS plenary for approval. A support letter will be provided by the Vice-Chair Candidate's Agency and the letter shall include a commitment by the Vice Chair Candidate's Agency to provide secretarial support for the two-year period that the candidate will serve as WGCV Chair. The nominee for CEOS WGCV Vice chair will be selected at the CEOS WGCV Plenary Meeting that is prior to the outgoing Chair's last CEOS Plenary Meeting. The Agency support letter shall be presented at the CEOS WGCV plenary meeting at which nominee will be selected.

The Chair shall call for candidates for nomination to Vice chair prior to the announcement of the CEOS WGCV plenary meeting that takes place before the CEOS WGCV plenary that selects the nominee.

Each candidate shall be introduced by the Chair at the beginning of the CEOS WGCV plenary meeting at which the nomination is to be held, latest. Each candidate shall be given at least 15 minutes to present her or his programme and objectives. Sub-bodies shall be informed about the candidates' objective and programme including CV before nomination, ideally at least 1 month before the CEOS WGCV meeting in which the election takes place to allow consultation with its members.

Before nomination, the selection of the WGCV Vice chair nominee is a voting process encompassing - with one vote each - each CEOS WGCV member and the leads of the Sub-groups representing the consensus within the Agency delegations and the CEOS WGCV Sub-groups, respectively. The voting is restricted to those CEOS WGCV members who have been present at a minimum of two out of the three WGCV plenary meetings held prior to the vote, with at least one of those being in-person attendance. Each vote is per agency and not per person, so the vote can be earned by and delegated to another agency representative. A list of those who are eligible for voting shall be published and distributed in advance of the plenary meeting during which the nomination shall occur.

The nomination is held at the end of the CEOS WGCV plenary meeting and starts with the confirmation of the voter's list by the CEOS WGCV plenary. The CEOS WGCV secretariat is responsible for collecting the votes and preparing the results. Those eligible voters, who are not in the position to participate in the nomination process, can participate either via mail or electronic mail sent to the CEOS WGCV secretariat.

The CEOS WGCV Chair announces to the WGCV Plenary the result of the vote immediately after the secretariat has prepared the results of the vote. The CEOS WGCV Chair will announce the nominated Vice Chair to the CEOS Chair, SEC and CEO and the CEOS WGCV chair will present the nominee for endorsement at the CEOS plenary.

## 3 Organization

The CEOS WGCV encompasses in its mandate a variety of activities that are handled through a variety of approaches. It is the Chairs' responsibility to coordinate all working mechanisms appropriately so that CEOS is aware of all CEOS WGCV activities. Four working mechanisms are relied upon to organize and coordinate the work of the CEOS WGCV:

- **Plenary meetings** – *the* forum of the CEOS WGCV
- **Work plan** – *the* outline of the activities of CEOS WGCV reflecting also the overall CEOS work plan
- **Deliverables** – *the* defined concrete output to be achieved from activities
- **Sub-bodies** – *the* opportunity to address a dedicated field of activity of the CEOS WGCV

### 3.1 Plenary meetings

Plenary meetings are the usual forum of CEOS Working Groups to discuss their activities, exchange the views between the members, decide about recommendations for CEOS (plenary), and decide how to achieve their deliverables in a suitable manner.

In the case of CEOS WGCV, the plenary meetings shall be held three times within the two-year term of a Chair agency, ideally every 9 months. The last meeting for a Chair agency shall be held within three months prior to the CEOS plenary. The Chairs, with the support of the secretariat and the host of the plenary meeting, will prepare for the meeting through development of an agenda, and announcement of dates, locale, and other logistics.

The following topics shall be brought to the attention of the audience:

1. Chair's report about the CEOS plenary, SIT meetings, and SEC teleconferences including the ideas and tasks which are brought by CEOS or other entities to the CEOS WGCV
2. The status of the activities of the sub-bodies including achievements, deliverables, and recommendations
3. The CEOS WGCV member reports
4. The activities at CEOS WGCV level
5. The interaction with other CEOS entities and other bodies
6. The Work Plan and Deliverables (CEOS and CEOS WGCV level)

However, the major objective of a plenary is also to build and maintain a forum for Cal/Val topics. Thus, the CEOS WGCV plenary shall contain topic oriented sessions to bring special issues to the attention of CEOS WGCV.

### 3.2 Work Plan

The work plan of CEOS WGCV shall guide the activities of CEOS WGCV including:

1. Introduction including scope, structure and document configuration management
2. Overall information about the work plan including
  - a. structure of the work plan
  - b. work embedded within and outside CEOS and the links between them
  - c. sub-bodies that exist and their purpose
  - d. ad hoc items that are currently part of WGCV's agenda
3. Mission, objectives, and tasks of each existing sub-body
4. Deliverable listing which includes the current status of
  - a. CEOS deliverables assigned to CEOS WGCV
  - b. CEOS WGCV internal deliverables
  - c. CEOS WCGV sub-bodies deliverables
5. Action item listing which includes the current status of
  - a. CEOS action items assigned to CEOS WGCV
  - b. CEOS WGCV internal action items
  - c. CEOS WGCV sub-bodies action items
6. Membership Listing of
  - a. CEOS WGCV membership including agency members and experts<sup>2</sup>;
  - b. Chairs/Vice-Chairs of CEOS WGCV and sub-bodies including contact information

The work plan shall be maintained continuously from one plenary to the next.

<sup>2</sup> In case no person has been directly delegated by a CEOS member agency, the CEOS PoC will be put in place for communication.

### 3.3 Deliverables

The CEOS work plan success is measured through deliverables. Reporting on deliverables to the different CEOS entities or bodies inform the CEOS community and broader public on the achievements of CEOS WGCV. Deliverable reporting also allows preservation of knowledge. CEOS WGCV deliverables shall be documented and filed with the CEOS WGCV secretariat to allow the communication within CEOS and the outside community. CEOS WGCV deliverables with general value shall flow into CEOS deliverables. CEOS WGCV will always align the CEOS deliverables regarding the CEOS WGCV with internal deliverables to ensure completion of those deliverables.

CEOS WGCV activities related to deliverables and the status of deliverable completion are to be documented in a record of CEOS WGCV documents in order to provide the CEOS community and other interested bodies a comprehensive source of information.

### 3.4 Sub-bodies

In order to cover the broad range of activities which are needed to enhance our knowledge and knowledge exchange about Cal/Val, the CEOS WGCV organizes itself in accordance with CEOS governance in different sub-bodies<sup>3</sup>

- **Sub-groups** – a sub-group is dedicated to a specific and focussed area of interest in order to discuss the topics on a broad scientific and technical basis. It is a discussion forum which allows action on selected topics of interest. The sub-groups are usually dedicated to sensor-oriented or thematic data product oriented topics. The sub-group will be led by a chair and vice-chair (or co-chairs) whose specific roles are determined by each Sub-group, but both (or all) will be relied on by the CEOS WGCV Chairs to provide insight into the Sub-group's activities. The method of nomination and selection of the chairs is at the discretion of the Sub-group membership. The length of term for the Chairs is not to exceed 5 years. The implementation of term limits and succession of Chairs is at the discretion of the Sub-group membership. A sub-group is open to CEOS members and scientific / technical experts, as well. Mission and objectives are part of the CEOS WGCV work plan. The mission and objectives and the concrete break-down of activities is given in the CEOS WGCV work plan.
- **Task teams** – a task team works with a defined implementation plan based on a schedule with well-defined milestones and goals that are achievable and deliverable in a limited time span of less than two years given appropriate resources. The task team terminates upon reaching the completion of its work. The task team will be led by two chairs which will take over the Task Team during the implementation phase between two CEOS WGCV plenaries. The first task of the Task Team Chairs is setting up the implementation plan and providing evidence of the funding necessary to meet the team's goals
- **Committee / ad hoc group** – a committee or ad hoc group is part of CEOS WGCV to advise the WGCV plenary in a dedicated and focused manner to guide decisions of the CEOS WGCV. The membership of a Committee/ad hoc group shall consist of no less than 3 persons from the CEOS WGCV membership. Its role and activities will be outlined in the work plan. One role of Committees/ad hoc groups is to address the need for systematic repositories for Cal/Val information within CEOS and the need for extensions of existing repositories.

Existing sub-bodies are defined in the work plan. Approval of sub-body chairs will be made by the CEOS WGCV plenary through nomination of chairs by the sub-body to the CEOS WGCV plenary.

The CEOS WGCV chairs and plenary, together with the chairs of the sub-bodies, will follow progress of sub-body activity through completion of the work plan deliverables and action items as well as reporting during CEOS WGCV Plenary Meetings. Continuation of a sub-body will be evaluated at the time of nomination of chairs for a sub-body. CEOS WGCV shall also discuss and approve explicitly the continuation of a sub-body in its given organization.

<sup>3</sup> Those are in accordance to CEOS governance on CEOS entity.

#### 4 Interaction with Other CEOS Bodies and Entities

The role, mission, and objectives of CEOS WGCV are not only as a self-standing activity in order to provide information to interested parties, but also as a CEOS Working Group which interacts intensively with all other CEOS Ad Hoc Teams, Virtual Constellations and Working Groups in supporting the work of CEOS with an emphasis on Calibration/Validation and data quality. The chairs of CEOS WGCV or a dedicated point of contact of CEOS WGCV, coordinates the interaction with other CEOS entities. The interaction of PoCs shall be immediately reported to the CEOS WGCV chairs regarding any issues that occur outside of the CEOS WGCV plenaries so that appropriate actions can take place.

CEOS WGCV fosters a special relationship to WMO/GSICS (Global Space-based Inter-calibration System), especially with the GRWG (GSICS Research Working Group) and its sub-bodies. The relation is vital to complement each other's activities in the field of Cal/Val and inter-calibration.