



Committee on Earth Observation Satellites

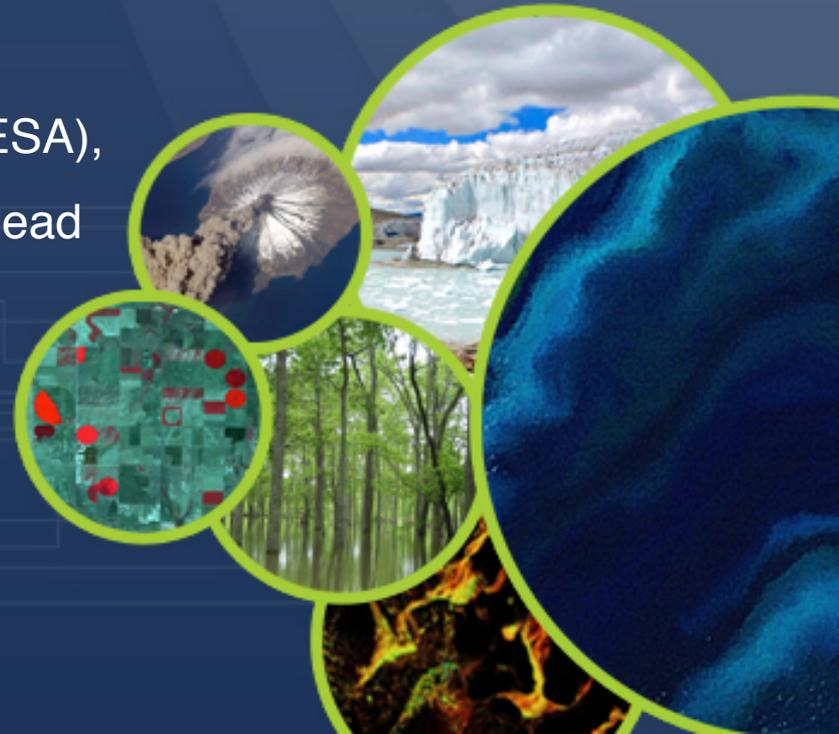
Atmospheric Composition Virtual Constellation 14 Meeting Intro

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CEOS AC-VC-14

College Park, MD, USA

2 – 4 May 2018





- Mission: CEOS ensures international coordination of civil space-based Earth observation programs and promotes exchange of data to optimize societal benefit and inform decision making for securing a prosperous and sustainable future for humankind.
- Established in September, 1984.
- CEOS is the space coordination arm of the Group on Earth Observations (GEO).
- Currently includes 32 Member Agencies (virtually all of the civilian space agencies) and 28 Associate members (GCOS, UNESCO, UNOSSA, WCRP, WMO, etc.)
- Best-effort organization. CEOS depends on its active Members and Associates to ensure that key activities have sufficient human resources and seamless leadership at all levels.

<http://ceos.org>

Virtual Constellations

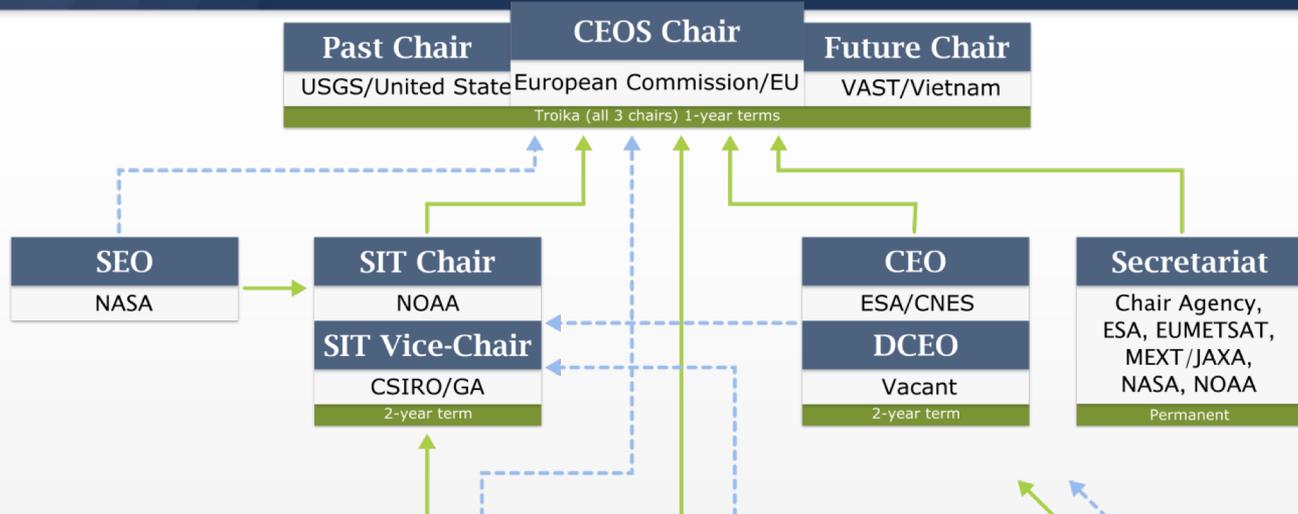
In support of the Group on Earth Observations (GEO) objectives and as the space component of the Global Earth Observation System of Systems (GEOSS), CEOS has developed the concept of virtual, space-based Constellations. A Virtual Constellation is a coordinated set of space and/or ground segment capabilities from different partners that focuses on observing a particular parameter or set of parameters of the Earth system.

The CEOS Virtual Constellations coordinate space-based, ground-based, and/or data delivery systems to meet a common set of requirements within a specific domain. They leverage inter-Agency collaboration and partnerships to address observational gaps, sustain the routine collection of critical observations, and minimize duplication/overlaps, while maintaining the independence of individual CEOS Agency contributions.

Please take a look at their individual pages for more detailed information about their activities. Currently, CEOS Virtual Constellations include:

- [Atmospheric Composition \(AC-VC\)](#)
- [Land Surface Imaging \(LSI-VC\)](#)
- [Ocean Colour Radiometry \(OCR-VC\)](#)
- [Ocean Surface Topography \(OST-VC\)](#)
- [Ocean Surface Vector Wind \(OSVW-VC\)](#)
- [Precipitation \(P-VC\)](#)
- [Sea Surface Temperature \(SST-VC\)](#)

We are here



We are here

Virtual Constellations		Working Groups	Ad Hoc Teams
AC-VC <ul style="list-style-type: none"> • NASA • ESA 	OST-VC <ul style="list-style-type: none"> • CNES • EUMETSAT 	WGCV <ul style="list-style-type: none"> • Chair: NASA • Vice-Chair: CSIRO 	SDCG for GFOI <ul style="list-style-type: none"> • ESA • UKSA • Vacant
LSI-VC <ul style="list-style-type: none"> • ESA • USGS • GA 	P-VC <ul style="list-style-type: none"> • NASA • JAXA 	WGCapD <ul style="list-style-type: none"> • Chair: ISRO • Vice-Chair: NASA • Sec: INPE 	GEOGLAM <ul style="list-style-type: none"> • NASA • CNES
OCR-VC <ul style="list-style-type: none"> • ESA • NOAA 	SST-VC <ul style="list-style-type: none"> • EUMETSAT • NOAA 	WGClimate <ul style="list-style-type: none"> • Chair: EUMETSAT • Vice-Chair: USGS 	Future Data Architectures <ul style="list-style-type: none"> • ESA • USGS • CSIRO
OSVW-VC <ul style="list-style-type: none"> • NOAA • EUMETSAT • ISRO 		WGDisasters <ul style="list-style-type: none"> • Chair: ASI • Vice-Chair: NASA 	Sustainable Development Goals <ul style="list-style-type: none"> • ESA • USGS • CSIRO
		WGISS <ul style="list-style-type: none"> • Chair: ESA • Vice-Chair: CSIRO 	

- Major past achievements
 - Early success: volcanic ash advisory prototype
 - Long-term monthly gridded pole-to-pole total O3 data
 - Vision and advocacy for air quality constellation architecture
- Planned future outputs
 - O3 profile and/or tropospheric O3 standardization activity [VC-2]
 - Validation standards for geostationary AQ data products [VC-3]
 - Architecture recommendation for GHG constellation [CARB-12]
- Potential coordination/advocacy efforts (to be discussed AC-VC-14)
 - Air quality associated with aerosol
 - Synergies of joint AQ/GHG measurements; OSSE capabilities
 - Transitioning from constellation advocacy to implementation, e.g. harmonized data access for users
 - Updating atmospheric composition measurements gap analyses



- CEOS Work Plan actions (deliverables)
 - CARB-12: Carbon observation constellation white paper [Q3 2018]
 - On track, further update in GHG session today
 - VC-2: Ozone dataset validation and harmonization [Q4 2020]
 - Discussion in AC-VC-14 to possibly identify specific O3 profile and/or tropospheric O3 deliverable within this timeframe
 - VC-3: Air quality constellation coordination [Q4 2018]
 - On track, “Validation Needs” white paper discussion and update tomorrow

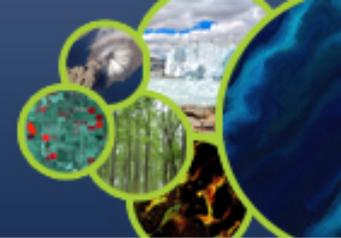
- Open SIT actions: there has been progress
 - SITTWS-2017-15 “CEOS SEC will liaise with AC-VC and use regional SEC contacts to engage appropriate agencies in Republic of Korea and China to facilitate open sharing of satellite data between all partner space agencies”
 - Korea NIER in active discussion with SEC re CEOS membership request for 2018 Plenary; open data sharing is one criterion
 - China National Satellite Meteorological Center has started posting TANSAT data (only L1b so far)

- Ongoing discussion: though the emergent AQ constellation is a success story, two measurement goals remain unmet and should be pursued by agencies
 - Extending geostationary AQ observations to the southern hemisphere and in particular to the developing world
 - Providing vertical profile measurements of carbon monoxide (CO) multiple times per day (relevant to goals of both the AQ and GHG constellations)
- Ongoing discussions regarding coordination structure for Carbon activities
 - Current AC-VC activity leading GHG measurement architecture is sustainable
- Related new discussion item: Cal/Val supporting GHG measurements
 - Calibration: Two areas that would benefit from CEOS coordination
 - Collection, analysis, quality control and dissemination of surface and in-atmosphere measurements collected at surface vicarious calibration sites
 - Lunar and solar observation standard for tracking absolute radiometric performance
 - Validation: CEOS should encourage member agencies to support/expand TCCON network
 - Current ~20 station TCCON network provides primary transfer standard for relating space based GHG measurements to the WMO in situ standard
 - Of the CEOS agencies, only NASA and JAXA support TCCON, and together they support only a small fraction of the network. Not sustainable.



- During discussion at the end of each topical session, revisit:
 - Are we on schedule for meeting current commitments?
 - Should AC-VC maintain a focus on this topic, and if so, what is the desired goal?
 - Are there additional near-term commitments (deliverables) associated with the topic that we want to propose? Who would lead them?







- CEOS has three primary objectives:
 - To optimize the benefits of space-based Earth observation through cooperation of CEOS Agencies in mission planning and in the development of compatible data products, formats, services, applications and policies
 - To aid both CEOS Agencies and the international user community by, among other things, serving as the focal point for international coordination of space-based Earth observation activities, including the Group on Earth Observations and entities related to global change
 - To exchange policy and technical information to encourage complementarity and compatibility among space-based Earth observation systems currently in service or development, and the data received from them, as well as address issues of common interest across the spectrum of Earth observation satellite missions
- Participation in the activities of CEOS will not be construed as being binding upon space-based Earth observation system operators, or as restricting their right to develop and manage Earth observation systems according to their needs and policies.