

STRATEGIC DIRECTIONS AND PARTNERSHIPS FOR CEOS

DISCUSSION PAPER

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Introduction

As the Chair of the CEOS Strategic Implementation Team (SIT), NOAA would like the community to reflect on several issues to help shape how CEOS can serve space agency needs and organize itself to capitalize on the significant opportunities before us for satellite Earth observations (EO) in the service of society.

For the term of the NOAA SIT Chairmanship, in addition to supporting the objectives of the CEOS Chairs, we wish to highlight:

1. Ensuring tangible outcomes from and sustainable commitment to our Virtual Constellations and Working Groups (VCs and WGs). NOAA will place emphasis on ensuring the necessary support is in place for our existing thematic teams to flourish and to deliver, and to provide productive opportunities for VC-VC and VC-WG interactions at SIT technical meetings and other *ad hoc* gatherings. NOAA SIT will bring attention of the VCs and WGs to the ongoing national EO program planning processes, including the Copernicus Next Generation planning, the U.S. National Academies Earth Science Decadal Survey, NOAA's space architecture studies, and Japan's future EO frameworks, among others, and in support of CEOS commitments in relation to the ECV inventory and Sustainable Development Goals.
2. Continued improvement of the CEOS relationship with its companion international coordinating groups: CGMS, GEO, and WMO, emphasizing the unique values of each. For example, with CGMS evaluating the joint and parallel working groups, with GEO through the CEOS engagement on the GEO and CEOS work plans/programmes and activities, and with the WMO through its strategic planning and coordination activities.
3. Enhancing the utility of observations from the next generation of geostationary satellites and exploring increased development of combination GEO/LEO products and data processing capabilities, bringing to bear the experiences of the CEOS VCs, and of WGs such as the WGCV and the joint WGClimate.

This paper is offered to stimulate discussion amongst Principals on these issues at SIT-33 (24-25 April 2018) and to help set directions and priorities for the two years of NOAA's SIT Chairmanship term.

Virtual Constellations and Working Groups

The SIT Chair would like to focus on the continuity and sustainability of the core work of Virtual Constellations and Working Groups. The unifying objective is establishing a clearer overall CEOS observing system assessment and desired observing strategies, which might serve as an input to CEOS Agency mission planning processes currently, or soon to be underway, for next generation Earth observing systems.

To support this objective, the following approach is being taken in preparation for SIT-33:

- A questionnaire has been circulated to VCs and WGs ahead of the February-March round of SIT Chair tag-ups taking stock of their current activities, tangible outputs, aspirations, blockers, and issues.

- The outputs from the tag-ups and questionnaire responses will be compiled, made available, and presented as the framing for a dedicated sessions at SIT-33.
- On the first day of the SIT-33 meeting, the VCs and WGs will present their recent work and their near-term planned activities and expected deliverables, with a focus on how their efforts contribute to these broader CEOS objectives.
- Information and topics that we expect to cover in this session include:
 - Ensuring an up-to-date understanding across CEOS Agencies of the outputs of each group, and the availability of these outputs to contribute to observing strategies;
 - Synergies that exist, or should exist, between the VCs and the WGs to support the broader CEOS objectives, including tangible opportunities for the framework provided by WG activities to align with and support the thematic activities and aspirations of the VCs;
 - Obstacles that exist to effective execution, some identified by individual groups, and options for their resolution; a full and frank understanding of the status and outlook for each group will help CEOS understanding of their potential contribution to the observing strategy.
- The session will then be capped off with a discussion amongst the SIT-33 participants on how their activities can be supported and sustained, and the outputs used in establishing a broader observing strategy to inform next generation systems. This discussion, guided by the SIT Chair, will help define a path forward for the SIT Chair term, and will specifically help identify topics and actions for the SIT Technical Workshop 2018, and the accompanying VC/WG Day.

Ad Hoc Teams

In recent years, *ad hoc* Teams (AHTs) have provided an important vehicle through which CEOS can more flexibly designate and manage resources to address emerging topics that don't fit into the existing VC or WG construct. Some, such as the SDCG for GFOI, are now in their 7th year of operation stretching the true definition of an *ad hoc* activity. SIT-33 will include a session that invites our AHTs to:

- Reflect and report on their group trajectory and lifecycle in relation to the thematic initiatives that they support;
- Present a clear understanding for SIT as to the outlook and evolution of those initiatives, including, if appropriate, long-term, sustained operations and the expectation for CEOS and CEOS Member Agency participation.

Following on the VC and WG discussions on the first day, we will guide the SIT-33 discussion, ask the CEOS membership to consider transition plans for some of the *ad hoc* activities, and consider developing a regularized process for future such efforts.

Partnerships

The SIT Chair would like to focus on further development of the CEOS relationship with CGMS, in part based on the success of the joint CEOS-CGMS WGClimate. The approach of this group is worthy of study to determine whether similar cooperation might apply to other domains. Potential areas of focus may include progressing CEOS carbon activities at a critical juncture in the development of future carbon-related EO programs, and around next generation GEO/LEO combination research and products (see below).

The SIT Chair would also like CEOS to ensure a sustained and productive coordination with GEO. Ensuring a well-understood mapping of CEOS priorities to the GEO Work Programme (GEO WP) will be a topic of discussion at SIT-33. Included in this discussion should be consideration for how to sustain current and future CEOS AHTs and activities initiated in support of the GEO WP as the WP efforts evolve - from community activities to initiatives and in some cases to become GEO Flagships. Two of the current CEOS AHTs – SDCG for GFOI, the CEOS *ad hoc* Working Group on GEOGLAM – are mapped to GEO Flagships. The Sustainable Development Goals AHT was initiated in

part to support one of GEO's three priorities, and it could be expected that future CEOS support to GEO may result in other AHTs being formed (pursuant to the *CEOS New Initiatives Process Paper*). The potential for, and sustainability of, structural homes within CEOS commensurate with the maturity of GEO activities needs to be considered.

Agenda time will be dedicated to consideration of the global EO strategy in response to the Paris Climate Agreement and the observing requirements associated with it. We will hear from WGClimate, from GCOS, and from CNES (on the Paris Declaration) and discuss linkages and synergies between different technical and political approaches.

Geostationary Applications and Combined Products

As the 2016 CEOS Chair, CSIRO focused attention on the Non Meteorological Applications of the new Geostationary EO satellites, specifically looking at the just launched Himawari-8 results. (Find the CEOS team report at http://ceos.org/document_management/Meetings/Plenary/30/Documents/6.1_Schroeder_NMA_Report_2016-09-05_v.2.00.pdf.) With some of the recommendations now being taken forward within a series of pilot activities by CGMS, and with the arrival of further new generation systems such as GOES-16 and -17 (launched November 2016 and March 2018, respectively), NOAA is proposing an expanded approach that looks at the potential for new research, products, and services from combined Low earth orbit (LEO) and GEO satellite observations. For example, the SIT Chair proposes:

1. Taking stock of progress towards the recommendations in the 2016 Report, as well as activities underway or planned within individual CEOS Agencies or collaborations between CEOS Agencies (such as the Japan-Australia collaboration: <http://geoapplications.org>).
2. Exploring possible cooperation between CGMS and CEOS in the execution of the three pilots proposed at the 2017 CGMS Plenary on: aerosol/dust observations; fire observations; flooding observations.
3. Consider how the CEOS Working Group activities, specifically WGCV, WGClimate, and possibly WGDisasters, can benefit the development of merged LEO/GEO products.
4. Studying the potential of these new data streams to contribute to the stated GEO and CEOS priorities of climate, disasters, and the SDGs, including in relation to provision of climate data records for the ECV inventory.
5. Considering development of GEO/LEO combination products and data processing capabilities and sharing experience and best practice among CEOS Agencies for maximum benefit from the new data streams. The relevance of the data to the CEOS Future Data Architecture (FDA) strategy will be considered and the possibility for contribution to the *CEOS Analysis Ready Data For Land* strategy (CARD4L), as well as potential extension of this approach to other domains beyond land (*e.g.*, coastal, oceans).

Next Steps

This short paper has served to begin to raise matters central to the future success of CEOS and its Space Agencies to the consciousness of CEOS Principals – with a view to a robust and productive exchange of views at the SIT-33 meeting in April 2018. The SIT Chair Team will work to develop further material on each topic to support and stimulate the discussions. **CEOS Agencies are invited to comment on the issues raised above and to suggest further related topics that can enhance the agenda for SIT-33.**