

CEOS Self Study Part 2:

ANNEXES

CEOS Self Study Annexes

| | |
|--|--------------|
| Annex 1: CEOS Self Study Team Members | A-1 |
| Annex 2: CEOS Major Milestones and Turning Points | A-2 |
| Annex 3: Study Team Reports | A-7 |
| <i>A. Summary – Study Team Report on Executive Functions</i> | A-8 |
| <i>B. Summary – Study Team Report on Working Groups and Societal Benefit Areas</i> | A-10 |
| <i>C. Summary – Study Team Report on Virtual Constellations</i> | A-12 |
| <i>D. Full Study Team Report on Executive Functions</i> | A-13 |
| <i>E. Full Study Team Report on Working Groups and Societal Benefit Areas</i> | A-81 |
| <i>F. Full Study Team Report on Virtual Constellations</i> | A-164 |
| Annex 4: Findings and Recommendations from Past Leadership Interviews | A-180 |
| Annex 5: List of Interviewees and Questions Used in Interviews | A-187 |

Annex 1: CEOS Self Study Team

Steering Committee Members:

Pakorn Apaphant
Stefano Bruzzi
Simonetta Cheli
Julio Dalge
Yukio Haruyama
Brian Killough
Kerry Sawyer
Guy Seguin
Brent Smith
Tim Stryker
Patricia Jacobberger-Jellison (Chair)

Study Team Leads:

Ivan Petiteville – *Study Team for Executive Functions*
Martha Maiden – *Study Team for Working Groups and SBAs*
Stephen Ward – *Study Team for Constellations*

Annex 2:
CEOS Major Milestones and Turning Points

CEOS: Major Milestones and Turning Points

1984 – 1993: Establishment and beginning years

- Established in September 1984, with Terms of Reference drawn up in response to a recommendation from a Panel of Experts on Remote Sensing from Space that was set up under the aegis of the G7 Economic Summit of Industrial Nations Working Group on Growth, Technology and Employment (Panel established in connection with 1982 Versailles G7 Summit Meeting); participating in the first meeting were representatives of CCRS, CNES, ESA, INPE, ISRO, NASA, NASDA and NOAA.
- CEOS met again in November 1986 and April 1989 and was chiefly regarded as a “talking shop.”
- Remote Sensing Panel of Experts provided status reports back to the G7 1982-1985 Summits, detailing CEOS establishment and initial activities, and issued a final May 1986 report. The 1990 G7 Summit reiterated “the importance of coordinating and the sharing the collection of satellite data on Earth and its atmosphere.”
- Starting in 1990, CEOS decided to meet on an annual basis.
- An ad hoc Working Group (WG) on Data initiated in 1984 became a standing WG in 1989 and was combined with an interim WG on Network Services in 1995 to become the WG on Information System and Services (WGISS); an ad hoc Sensor Calibration and Performance Validation WG became a standing WG on Calibration and Validation in 1990.
- The UK Prime Minister invited environmental agencies of countries active in Earth observation and CEOS space agencies to an April 1992 Conference on Space and Environment to help prepare the 1992 Rio Earth Summit (UNCED). BNSC produced a CEOS Dossier for distribution at UNCED, “The Relevance of Satellite Missions to the Study of the Global Environment,” with detailed mission and instrument tables. This publication served as a prototype for follow-on documents produced by ESA and the current on-line Missions, Instruments and Measurements Database.
- CEOS, at its 1992 Plenary, created a permanent Secretariat (ESA, NASA, NOAA, STA/NASDA) that carries on the work of CEOS in monthly telecons under the leadership of the current CEOS Chair agency. EUMETSAT was added to the Secretariat at a later date; Japanese STA/NASDA representation changed to MEXT/JAXA following a reorganization within the Japanese government.
- NASDA (later JAXA) in 1993 began and has continued publication and distribution of the CEOS Newsletter as well as various versions of a CEOS brochure.
- 1992 Plenary adopted Satellite Data Exchange Principles in Support of Global Change Research; and CEOS at its 1994 Plenary adopted Principles of Satellite Data Provision in Support of Operational Environmental Use for the Public Benefit.

1994 - 2003: Initial Refocusing

(Creation of the SIT; pursuit of IGOS with UN and S&T organizations that became CEOS Associates)

- CEOS in 1994 set up a Task Force on Planning and Analysis to focus on gap analysis, requirements and how to make CEOS more effective.
- Incoming 1996 CEOS Chair, CSIRO/Brian Embleton, followed up on impetus to refocus CEOS and make it more dynamic through creation of a Strategic Implementation Team (SIT) that would meet at CEOS Principal level to address gaps/overlaps and to develop an overall strategy for the stepwise implementation of the space component of an Integrated Global Observing Strategy (IGOS); the 1996 Plenary approved the establishment of SIT which held its first meeting in February 1997. SIT Chairs have two year terms and SIT initially met twice a year.
- CEOS Affiliate (later Associate) Agencies (most of them UN agencies or S&T organizations) participated in CEOS Plenaries and SIT in working to structure IGOS.
- 1996 Plenary organized an Analysis Group led by NASDA/Yukio Haruyama to continue the work completed by the Task Force on Planning and Analysis.
- IGOS-related side meetings at 1997 Montreal CEOS Plenary and elsewhere led to the formal creation of IGOS at ICSU headquarters in Paris in June 1998 with 13 founding partners including CEOS.
- SIT meetings and CEOS Plenaries in the period 1996-2004/5 focused on the development of specific IGOS Themes and coordination of space-based and *in situ* observational assets. The rotating CEOS Chair (specifically supported by the SIT Chair) was Co-Chair of IGOS, with the other IGOS Chair rotating from among the UN agencies that comprised an Earth observation-related UN Interagency Coordination and Planning Committee. Themes completed under the IGOS Partnership were: Atmospheric Chemistry, Carbon Cycle; Coastal, Cryosphere, Geohazards, Land, Ocean, and Water Cycle. (The IGOS Partnership was formally dissolved in its final meeting at UNESCO in Paris in May 2008 with IGOS Themes transitioning to Communities of Practice under GEO).
- An ad hoc WG on Earth Observation Education and Training (WGEdu) was created in 1999.
- A CEOS ad hoc Disaster Management Support Group from 2000 to 2002 focused on development and refinement of recommendations for the application of satellite data to selected hazard areas.
- CEOS began to focus on sustainable development by playing a key role at the August/September 2002 World Summit on Sustainable Development (WSSD) in Johannesburg and by inaugurating a CEOS WSSD Follow-Up Programme and ad-hoc WSSD Follow-Up Team.
- CEOS organized a September 2003 Capacity Building Workshop in Stellenbosch, South Africa, and at its 2003 Plenary formally added Capacity Building to the remit of WGEdu.

- 2003 Plenary adopted a set of CEOS WSSD Follow-up Programme Capacity Building Principles and also adopted a set of CEOS Utilization Principles and Recommendations following a one-year study by a CEOS Data Utilization Team.

2004 – present: CEOS as key contributor to GEO/GEOSS, GCOS, UNFCCC/SBSTA

(Refocusing of CEOS as the Space Arm of GEO/GEOSS and focal point for space-based climate-related requirements of GCOS and the UNFCCC/SBSTA: CEOS focus on being responsive and on making key contributions to these overarching external organizations)

- CEOS Agencies played a key role in participating on their national delegations, with CEOS itself a “Participating Organization,” in the convening of the 31 July 2003 Earth Observation Summit in Washington, DC that adopted a Declaration establishing an ad hoc intergovernmental Group on Earth Observations (GEO). GEO Members and Participating Organizations met in subsequent Summits in Cape Town, Tokyo and in February 2005 with their Ministers in Brussels where the intergovernmental GEO was formally created with endorsement of a Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan.
- CEOS at its 2003 Plenary in Colorado Springs adopted a formal statement welcoming the establishment of the ad hoc GEO and pledging close coordination of CEOS activities with those of GEO. Over a two-year period through 2005, the CEOS/GEO relationship was addressed through a CEOS Task Force on Future Relations with GEO and the Implications for CEOS.
- CEOS has subsequently worked closely with GEO/GEOSS as its space component:
 - CEOS has taken Lead or Co-Lead of several GEO Tasks;
 - CEOS developed Virtual Constellations for GEO (currently six of them);
 - CEOS has provided a Co-Chair of the GEO Architecture /Data Committee;
 - CEOS began an annual CEOS/GEO coordination meeting in 2007, followed by a January/February annual CEOS/GEO workshop
 - CEOS and its agencies have stepped up to participate and provide critical data sets for key GEO-related initiatives such as Global Forest Carbon and GEO (disaster-related) Supersites and are also being asked to participate in JECAM (Joint Experiment for Crop Assessment and Monitoring) and a GEO-G20 Initiative on Agricultural Monitoring;
 - The GEO Secretariat Director/GEOSEC staff normally participate in CEOS Plenary and SIT meetings;
 - The CEOS Chair/SIT Chair and CEOS Secretariat advisors represent CEOS in annual GEO Plenaries and in GEO Ministerial Meetings every 3rd year;
 - CEOS worked with the South African hosts on a successful side event/reception at the 2007 GEO Ministerial in Cape Town; and
 - CEOS regularly publishes and distributes to GEO Principals at GEO Plenaries a short summary handout of CEOS contributions to GEOSS. A glossy High-Level publication, “Satellites, Science and Society” was prepared and distributed at the 2010 GEO Ministerial in Beijing.

- CEOS has connected with the Global Climate Observing System (GCOS) in stepping up to address satellite-related requirements related to GCOS-identified Essential Climate Variables in connection with GCOS Implementation Plans and the GCOS request for a Satellite Supplement document. In connection with its role in support of GCOS, but also because of its key role in the “systematic research and observations” area of focus of the UN Framework Convention on Climate Change (UNFCCC), CEOS has received specific charges and taken on responsibilities beginning with the 2004 UNFCCC Conference of the Parties (COP) in Buenos Aires and continuing with a direct charge given CEOS by the UNFCCC’s Subsidiary Body for Scientific and Technological Advice (SBSTA) in 2009.
- CEOS has in recent years participated in organized side events in connection with UNFCCC COP meetings.
- With its own G7-related heritage, CEOS has been particularly mindful of connecting with current G8 and potentially G20 activities and resolutions. In this connection, CEOS particularly noted the July 2005 UK-hosted G8 Gleneagles Plan of Action on Climate Change, Clean Energy and Sustainable Development and the Japan-hosted July 2008 G8 Hokkaido Toyako Summit Declaration on Environment.
- 2008, 2009 and 2010 CEOS Chairs undertook to develop and highlight a CEOS Data Democracy initiative in connection with efforts by CEOS agencies and GEO to make satellite data more broadly available to users, particularly in developing countries; the 2010 Plenary issued a charge for the CEOS Chair, WG Chairs and the CEOS Secretariat to investigate how best to incorporate the Data Democracy initiative within the CEOS structure.
- CEOS at its 2010 Plenary approved creation of a Working Group on Climate.

Annex 3: Study Team Reports

- A. Summary – Study Team Report on Executive Functions
- B. Summary – Study Team Report on Working Groups and Societal Benefit Areas
- C. Summary – Study Team Report on Virtual Constellations
- D. Full Study Team Report on Executive Functions
- E. Full Study Team Report on Working Groups and Societal Benefit Areas
- F. Full Study Team Report on Virtual Constellations

CEOS Self Study Summary Report

Executive Functions

The CEOS Executive Functions are conducted within several CEOS leadership roles including the CEOS Chair, CEOS SIT Chair, CEOS Secretariat (SEC), CEOS Principals, Working Group Chairs and the CEOS Chief Executive Officer (CEO). These functions are critical to the operation of the CEOS organization and to its success. This study utilized responses to 28 questions from 9 recent or current CEOS Executive leaders. The key results of those responses, organized by topic, are contained in this summary report and reflect a combination of strengths and weaknesses in the organization. Several recommendations for the future are noted throughout the report.

(1) The current organizational structure, responsibilities and term durations are acceptable to the majority and there is also agreement that the current voluntary approach is acceptable. The addition of the funded CEO and SEO roles are viewed as positive recent contributions to CEOS. In the case of the CEO, there is a need to readdress the roles and responsibilities to increase the focus on strategic issues and maintain continuity of support.

Recommendation: Update the CEO roles and responsibilities (or Terms of Reference) to increase the focus on strategic initiatives rather than administrative functions. In addition, the term of the CEO should be 2 or 3 years to maintain continuity of operations.

(2) Active participation of the CEOS members and associates is critical to the success of CEOS. There are currently 29 space agency members and 21 associates with a potential for more in the future. In order to ensure active participation of those members and associates, there must be a clear method for accepting new members and monitoring the participation of current members and associates. As a volunteer organization, it is critical that CEOS maintain an active membership to achieve its planned goals.

Recommendation: New CEOS members and associates should be accepted as "temporary" for a one-year probation period prior to acceptance as full members or associates of CEOS. This period will be used to evaluate the engagement and contributions of those members to the CEOS organization, Working Groups, Constellations and other CEOS functions. "Full" membership should only be considered by majority vote following the completion of the probation period.

Recommendation: CEOS should monitor the attendance of members and associates to CEOS meetings, including Plenary, SIT, Working Groups and Constellations. Inactive members, not participating in CEOS meetings or activities for 3 years or more, should be considered for removal from the CEOS membership and contacted directly by the CEOS Chair.

(3) CEOS has become a very active organization in the international community and has initiated many new activities as a result. As we move forward, there will likely be many more activities to consider. In order to best address the relevance of an initiative for CEOS, it should be compared with a CEOS Strategic Plan and be strongly supported by one or more agencies. In order to ensure this process, CEOS will need to consider a long-term Strategic Plan and process for reviewing potential new initiatives.

Recommendation: CEOS should develop a concise, yet complete, 5-year Strategic Plan that is updated annually at the beginning of the calendar year and approved at the first annual SIT meeting. This plan should include a mission statement, list of primary objectives, establish and maintain a list of CEOS initiatives that may be adjusted during the year, address outreach and communication objectives, and define the objectives of key telecons and meetings. The plan should not only consider GEO Work Plan goals, but also seek additional inputs from the CEOS Constellations, Working Groups and Associates.

Recommendation: CEOS should establish a process for review and acceptance of new major initiatives and projects. This process would consider new initiatives at any time during the year, but require sufficient member support and agreement of the CEOS Chair and SIT Chair to be added to the CEOS Strategic Plan.

(4) It is recognized by many of the CEOS members and associates that there are a number of telecons and meetings throughout the year. These meetings are critical to the success of CEOS, since international cooperation and partnerships are not possible without these interactions. In order to improve the outcome of these telecons and

meetings, CEOS should address the focus and agendas of telecons and meetings to prepare appealing agendas of policy relevance or critical issues pertaining to CEOS initiatives.

Recommendation: CEOS should define the objectives of the CEOS SEC telecons, CEOS SIT Meeting, and CEOS Plenary meeting in the CEOS Strategic Plan (see item 3). Telecons and meetings should focus agendas on critical issues regarding CEOS initiatives to ensure engaged participation and policy discussions. Routine reporting should be included in the written material of telecons and meetings, but not the focus of telecon or meeting agendas.

(5) CEOS has become a recognized organization among many political (i.e., G8, G20, UN) and non-CEOS groups (i.e., UNFCCC, IPCC, CGMS, etc). The relationship between CEOS and those groups is critical to our success and CEOS should carefully consider how to best engage with those groups. CEOS attendance at external meetings has always been carefully considered by the CEOS leadership and this should continue in the future. It is recognized that GEO is the primary customer of CEOS, but CEOS should maintain awareness and engagement with other external political and non-political groups to accomplish its mission.

(6) Much of the success of CEOS is due to the outstanding accomplishments of the CEOS Working Groups and Constellations. External agencies recognize these CEOS groups are the primary forum to address Earth observation needs and often request CEOS support. These requests result in a large number of potential tasks within each Working Group or Constellation with no process to evaluate relevance and priority.

Recommendation: CEOS SIT and/or Plenary meetings should allow sufficient time for Working Groups and Constellations to present their priority tasks and new potential initiatives. These presentations should not focus on status, but rather issues regarding priority and support. The CEOS Chair and SIT Chair should establish priorities for the Working Groups and Constellations by reviewing these initiatives and gathering feedback from the SEC and CEOS Principals to reach decisions.

It is recognized by all those interviewed that the CEOS Executive functions are critical to the success of CEOS. The outstanding accomplishments of the organization are a direct result of this leadership. In order to ensure success in the future, the recommendations in this report strive to focus the functions of the CEOS organization and its leadership while sustaining an active CEOS membership to reach its goals.

CEOS Self Study Summary Report

CEOS Working Groups and Societal Benefit Area Coordinators

CEOS Working Groups (WGs) and Societal Benefit Area (SBA) Coordinators provide both the oldest and most recent mechanisms for CEOS Agency coordination. The WG on Calibration and Validation (WGCV) and the WG on Information, Systems, and Services (WGISS) date back to the 1980s and have traditionally been more focused on intra-CEOS member agencies' activities: WGCV, to ensure long-term confidence in the accuracy and quality of Earth observation data and products; and WGISS (initially named the WG on Data), to facilitate complementarity among Agencies' data and information systems, and to enhance user access. The other two WGs, with shorter histories, began with a greater external focus to their activities: the Working Group on Education, Training, and Capacity Building (WGEdu), to support training and capacity building for more effective utilization of CEOS Agencies' Earth observation (EO) data; and the Working Group on Climate (WGClimate), to facilitate the development and use of Essential Climate Variable (ECV) time-series through coordinated CEOS Agency initiatives. CEOS SBA Coordinators (and, where applicable, the teams they lead) help to define and implement CEOS actions in support of the SBAs in the GEO Work Plan. They are assigned to cover nearly all GEO subject-specific SBAs and transverse activities.

With the advent of GEO, WGCV, WGISS, and WGEdu, have re-oriented their work, to greater or lesser degrees, to meet GEO's stated needs. Through the GEO framework, all CEOS WGs and SBA teams are now seeking to provide priority, substantive products to external users: delivering greater confidence in space-based Earth observation (EO) data, increasing ease of access to EO data by all user communities (from beginner to expert), and delivering new data and information products for societal benefit and enhancing capacity for their use.

This summary of highlights from the Study Team's report describes the strengths, weaknesses, opportunities, and threats to the WGs and SBA teams. Many apply to both WGs and SBA teams, though some apply specifically to the SBA teams.

Strengths: The CEOS WGs have clearly-defined and well-understood roles on behalf of CEOS. They are supported by highly-motivated and highly-qualified technical experts from CEOS Agencies. Therefore, the WGs have a proven track record of accomplishments. Examples of these accomplishments include: assembly of a global, land 1km data set, establishment of the CEOS International Directory Network (IDN), development of new tools to support a single user interface to multiple data catalogues, community-oriented data/information portals, maintenance of a worldwide network of calibration/validation test sites, quality assurance practices for EO data, training workshops and modules on the use of satellite data, and coordinated climate information product development.

CEOS SBA Coordinators are closely aligned with current and future GEO Work Plan tasks. Many have been very active in working with the GEO Secretariat and related Communities of Practice (CoPs), to identify the appropriate role for CEOS Agencies in providing data and technical expertise in support of GEO objectives.

Weaknesses: Currently, only a small minority of CEOS Agencies (~20% of the membership) support a majority of the workload taken on by the CEOS WGs and SBA Coordinators. Leadership succession remains uncertain for both WGCV and WGISS, with neither group having prospective Vice Chair identified for 2012-2013. Horizontal coordination among WGs, SBA Teams, and especially the CEOS Virtual Constellations (VCs) is often lacking, resulting in sub-optimized work plans and priorities among all three groups. Additionally, although much effective work takes place in certain SBA Teams, there is a general lack of awareness in CEOS about their activities (with climate, and perhaps disasters, being exceptions).

Opportunities: The structure and complementary nature of the four WGs and SBA teams provides them the opportunity to enhance CEOS Agencies' service to stakeholders across their entire spectrum of needs: responsiveness to user requirements, data quality, data availability, and capacity-building for data and information products. Furthermore, the WGs' technical expertise and the SBA teams' topical orientation make them well-placed to effectively carry out the highest priority assignments from GEO and CEOS leadership, with the appropriate direction, coordination, and resources. Recently, reorientation of the WGEdu toward the broader implementation of the GEO/CEOS Data Democracy initiative should help CEOS enhance user capacity through full and open provision of EO data and related the tools for its effective application and use.

Threats: The work of the CEOS WGs and SBA teams suffers from the lack of a coherent list of priorities from GEO and CEOS leadership. With so many prospective tasks and the flawed perception that WGs and SBA teams can do anything for anyone, it is all too easy for these groups to get overwhelmed. This situation is coupled with the fact that the CEOS SIT and Plenary meeting agendas have not been conducive to the necessary dialogue on WG/SBA priorities and activities. WGs and SBA Teams have often formulated their own priorities, with little executive guidance on their annual work, and with minimal Agency resource allocation for their initiatives.

To address this situation, upon analysis of the Study Team's findings, the Steering Committee offers the following recommendations:

1. **CEOS leadership meetings should empower and prioritize the work WGs and SBA teams.** The CEOS Plenary and/or SIT meetings should provide venues for WG and SBA leaders to present their proposed priorities, to discuss and determine them and confirm adequate supporting resources for the coming year. Meeting agendas and participation should be reconfigured to provide sufficient time for discussion of WG/SBA team recommendations, and for strategic prioritization and direction to WGs/SBA teams on their annual work. WGs and SBA teams should be encouraged to more specifically measure and document their progress in relation to CEOS's highest priorities.
2. **CEOS Agencies should increase their provision of personnel and resources to WGs and SBA teams.** WGs and SBA teams will be hard-pressed to continue their work without additional manpower provided by a wider range of CEOS Agencies. One potential remedy for this situation would be the contribution of one staff member to a WG, SBA team, or a VC, as a condition for continued CEOS membership. CEOS Agencies that contribute personnel should also provide a corresponding level of resources to support the objectives of the WG or SBA team.
3. **Strengthen working relationships among WGs, SBA Coordinators, and VCs to support common CEOS objectives.** Some progress has been made in this area, through the conduct of joint meetings and designation of WG representatives to certain VCs. These efforts should be accelerated around high-level CEOS initiatives and their cross-WG/SBA synergies, rather than on a project-by-project (or even SBA-by-SBA) basis. The CEO and DCEO are encouraged to attend WG meetings to help communicate CEOS priorities on a cross-WG and cross-SBA basis. The CEOS web site should be made a more useful tool for internal, horizontal CEOS communications and initiative/task coordination across WGs, SBAs, and VCs.
4. **SBA Coordinators should have clearly-articulated and published goals and objectives.** Current SBA Coordinator work exists on a rather *ad hoc* basis. SBA Coordinators' roles, responsibilities, and terms should be formalized through development of position descriptions that are developed by the SIT and reviewed and endorsed by the CEOS Plenary. Routine outreach to GEO Secretariat staff and routine reporting to CEOS Secretariat members should be part of the SBA Coordinators' responsibilities.

CEOS Self Study Summary Report

Virtual Constellations

The CEOS Virtual Constellations concept was introduced in 2006, favorably received by CEOS agencies, and has gained considerable momentum and support since that time. Starting with 4 prototype Constellations, CEOS now has 6 Constellations, with another, Sea Surface Temperature, in the approval process and anticipated to commence formally at 25th CEOS Plenary. The Virtual Constellations concept has focused CEOS coordination at a critical time, coincident with the emergence of GEO and the focus on climate. Constellation partnerships between research and operational space agencies have significantly strengthened the prospects for continuity of observations.

The CEOS Constellations, though diverse in scope, have shared a variety of common outcomes and achievements. These include common requirements and guidelines, focused projects and assessments and improved data distribution and sharing. One outcome common to all Constellations is the recognition that these groups are an effective forum for improved international coordination and advocacy. The Constellation framework supports focused community involvement, which is critical for maintaining momentum well into the future.

As these groups move forward, there will be considerable opportunities in the climate domain and a variety of new potential missions and partnerships needed to sustain progress. Such opportunities may require refocusing Constellation objectives or even an evaluation of scope to strengthen support for a climate architecture.

The primary weakness, common to all of the Constellations, is the lack of universal participation. Of the 29 CEOS space agencies, only 8 are represented in 3 or more Constellations. Representation of all relevant CEOS agencies and participating members is critical to the success of Constellations. Such participation will benefit international coordination of missions and projects and establish clear support and advocacy for those missions and projects. A further weakness is the lack of response from CEOS leadership and agencies to implementation challenges raised by the Constellations process. The most common threat to continued success of the Constellations is fragile funding and the lack of new or sustained missions.

As a result of this study, the following four recommendations are proposed for implementation in CEOS. These are a subset of those listed in the main body of the report and reflect near-term priorities along with consideration for the likelihood of implementation.

- CEOS should address the issue of agency participation in the Constellations through proactive engagement of key agencies by CEOS leadership. The benefits and opportunities of participation in the Constellations should be well formulated and communicated to the relevant Principals.
- Constellations efforts should give greater emphasis to the physical results of coordination, such as data products. For example, there is an immediate demand for such implementation support aiding the coordination efforts of the WGClimate. WGClimate and the anticipated Sea Surface Temperature Constellation should demonstrate the implementation partnership between Constellations and WGClimate and indicate how this pilot might be expanded to outcomes for each of the Constellations.
- The CEOS SIT and CEOS SEC processes and meetings should be adapted to identify, and escalate as appropriate, important outputs from the Constellations that have implementation implications, and to guarantee debate between Principals with supporting observation programmes.

It is believed the CEOS Constellations are an effective element of CEOS and have the potential to make significant progress in the future. Realisation of the recommendations above will ensure these opportunities are realized while avoiding potential threats.

CEOS SELF STUDY**REPORT FROM STUDY TEAM ON EXECUTIVE FUNCTIONS***Issue 1.0, dated September 2, 2011***Introduction**

In the scope of the CEOS Self Study initiated by the next CEOS SIT Chair team (NASA), three study groups have been established to evaluate & provide input on:

- Executive Functions (SIT, SEO, Secretariat)
- CEOS Working Groups & SBA Teams
- Constellations

Each Study Team has been requested to produce a report. This document is the report from the Study Team on Executive Functions.

Background**1.1 Study Team on Executive Functions**

The Study Team on Executive Functions has been formed in June 2011. All the team Members have occupied either themselves or their management, executive functions in CEOS, in the last 5 to 7 years or will occupy those functions in the coming years: CEOS Chair, CEOS SIT Chair, CEOS SEC, CEOS Principals, Working Group Chairs or CEO. The Members of the Study Team on Executive Functions are:

| Name | Agency or Organization | Role in CEOS |
|-----------------------|-------------------------------|--|
| Christopher Blackerby | NASA | 2012-2013 SIT Chair team and NASA Principal Support team |
| Stephen Briggs | ESA | 2006-2007 SIT Chair team and ESA Principal Support team |
| Stefano Bruzzi | ASI | 2011 CEOS Chair team |
| Gilberto Camara | INPE | 2010 CEOS Chair and INPE Principal |
| Simonetta Cheli | ESA | ESA Principal Support team |
| Jean-Louis Fellous | ESA | ESA Principal Support team |
| Mike Freilich | NASA | 2012-2013 SIT Chair and NASA Principal |
| Roy Gibson | ESA | 2006-2007 SIT Chair team and ESA Principal Support team |
| Pascal Lecomte | ESA | 2008-2009 WGCV Chair |
| Osamu Ochiai | JAXA | 2010-2011 SIT Chair team |
| Ivan Petiteville | ESA | 2008-2010 CEO and 2006-2007 WGISS Chair |
| Jaiswal Rajeev | ISRO | 2012 CEOS Chair team and ISRO Principal |

| | | |
|-----------------------|---------|---|
| | | Support team |
| Klaus Schmidt | DLR | DLR Principal |
| Brent Smith | NOAA | 2008-2009 SIT Chair team and NOAA Principal Support team |
| Pascale Ultré-Guérard | CNES | CNES Principal |
| Stephen Ward | Symbios | 2011 CEOS Chair team and support to several past CEOS Chair and CEOS SIT Chairs |

1.2 Methodology

A questionnaire including 28 questions relative to CEOS executive functions has been distributed to CEOS members early June 2011 for review. The consolidated version has been sent to all the Members of the Study Team on Executive Functions around mid-June. The individual questions may be found in section 1 (“Survey Results”).

Responses have been received from several team members during the months of June and July 2011 and constitute the basis for producing the team report. All the responses can be found in the Annex A “Individual Responses” (page 18).

The team report will be consolidated by the team beginning of September 2011 before being passed officially to the CEOS Self Study Steering Committee, before the SIT Technical Workshop (Sep. 13-15, 2011).

Survey Results

Nine Team Members have filled the questionnaire. Detailed answers may be found in the Annex A “Individual Responses” on page 18. For some questions, there is a general consensus on the responses provided and in that case the report draws clear recommendations. When the responses to a specific diverge too much, the report summarizes the various points of views but further brainstorming and discussion might be necessary to conclude. Please, note that for every single question, the summary of the responses received does not refer to all response elements but only to the ones judged by the team as being the most significant ones.

NOTE: to access the detailed answers provided in response to a specific question, please, press the CONTROL key while clicking on the text of the question (left column) in the following table. This will lead you to the relevant responses table in the annex.

| Survey Questions | Summary of responses received |
|---|--|
| <p><u>Question 1.1:</u> Are the current start date and duration of CEOS Chair term satisfactory? If not, how long do you think the mandate should be?</p> | <p>Responses range from one year (current duration) to two years (alternating with the SIT Chair change). Advocates for the two years justified their proposals to ensure continuity in the CEOS activities. Several members (even those suggesting a two-year mandate) raise the issue that some CEOS Members, in particular the “small agencies” might face because of the resources required by the Chair team.</p> <p>For what concerns the starting date, changing the CEOS Chairmanship at the occasion of the CEOS Plenary is accepted by everyone but one team Member recommended the CEOS Plenary to be held earlier, well in advance of the GEO Plenary (e.g. the September or October time frame instead of November)</p> <p>RECOMMENDATION: To be escalated to CEOS Self Study Steering Committee</p> |

| Survey Questions | Summary of responses received |
|---|---|
| <p><u>Question 1.2:</u> Are the current start date and duration of CEOS SIT Chair term satisfactory ? If not, how long do you think the mandate should be?</p> | <p>All team Members agree that 2 years for the duration of the CEOS SIT Chairmanship is OK.</p> <p>One team Member stated that having a SIT Chair in addition to the CEOS Chair creates a problem of governance for CEOS because of the “double hierarchy”. He proposed the suppression of the role of the SIT Chair and suggested the SIT meetings to be replaced by CEOS technical meetings, dedicated to oversee the tasks CEOS agencies are engaged, either as part of GEO Work Plan or as part of CEOS activities.</p> <p>RECOMMENDATION: The 2-years duration is OK. The role of the SIT needs further discussion. To be escalated to CEOS Self Study Steering Committee</p> |
| <p><u>Question 1.3:</u> Are the responsibilities of the CEOS Chair satisfactory for the good functioning of CEOS ?</p> | <p>Majority of Members are satisfied with the current responsibilities of the CEOS Chair.</p> <p>RECOMMENDATION: Current situation satisfactory. No specific action needed.</p> |
| <p><u>Question 1.4:</u> Are the current composition (ESA/EUMETSAT, NASA/NOAA and MEXT/JAXA, CEOS Chair) and responsibilities of the CEOS Secretariat satisfactory ?</p> | <p>Majority of Members are satisfied with the current composition and with the work accomplished so far. Several comments warned against having a SEC with too many members that would make it unmanageable.</p> <p>One team member wonders whether it is time to “broaden the membership of the Secretariat to member agencies from</p> |

| Survey Questions | Summary of responses received |
|--|--|
| | <p>emerging economies, such as the basic group (Brazil, South Africa, India, China).</p> <p>RECOMMENDATION: Current situation satisfactory for the majority. Steering Committee to decide whether a discussion on the enlargement to emerging space agencies is needed or not.</p> |
| <p><u>Question 1.5:</u> Is the current schema of voluntary contribution based on a best effort basis sufficient to ensure the successful execution and timely completion of the CEOS activities?</p> | <p>Unanimous agreement to continue with the current schema based on voluntary contribution given the satisfactory involvement of CEOS agencies. One team member suggested the creation of a permanent secretariat (extension of the CEO / DCEO team) but in response to question 1.6 (next one) another member recalled that “a proposal to instead have a permanent paid Secretariat was not approved at the 2006 Buenos Aires Plenary and the alternative of having a CEO, buttressed by the development of the SEO, has been a better solution to what CEOS needs.”</p> <p>RECOMMENDATION: Current situation satisfactory for the majority. Steering Committee to decide whether a discussion on the creation of a permanent secretary or not.</p> |
| <p><u>Question 1.6:</u> are the current entities dedicated full time to CEOS (CEO and SEO) sufficient to ensure a proper functioning of CEOS?</p> | <p>Most of the responses recognize that, in general, good work has been performed by both the CEO and SEO teams. A couple of responses mentioned that those functions might be better used. In particular the reinforcement of the CEO with the DCEO should be the occasion for the CEO to spend more time on</p> |

| Survey Questions | Summary of responses received |
|---|--|
| | <p>strategic issues. The possibility of having a CEO Leader more than Support was also mentioned in response to the next question 1.7.</p> <p>As for question 1.5, one member suggested the creation of a small team (4 to 5 persons)</p> <p>RECOMMENDATION: Responsibilities of CEO needs to be refocused to include more strategic thinking. To be defined in the ToR to be written (see question 1.7bis)</p> |
| <p><u>Question 1.7:</u> is the current term duration (2 years) for the CEO position adequate? If not what should it be?</p> | <p>Most of the members recommended a three-year term , some raising the issue of the extra cost for the agency in charge of fulfilling that role. It would reinforce the continuity while CEOS Chair rotates every year and SIT Chair every two years.</p> <p>RECOMMENDATION: Decision on the more adequate duration (2 or 3 years) to be escalated to CEOS Self Study Steering Committee</p> |
| <p><u>Question 1.7bis:</u> are terms of reference for the CEO position needed?</p> | <p>Most of the responses agreed that ToR are needed, and that the initial draft ToR (written at the time Jean-Louis became CEO) are outdated. This also covers some of the issues on the role of the CEO, addressed by some in response to question 1.6</p> <p>RECOMMENDATION: New ToR for the CEO and DCEO to be written</p> |

| Survey Questions | Summary of responses received |
|--|---|
| <p><u>Question 1.8:</u> are the current criteria for accepting new CEOS Members and Associates adequate? If not, should we have less stringent criteria or on the contrary more rigid ones and which ones?</p> | <p>All agree that the current criteria are OK. Some raised the lack of involvement in CEOS Plenary, CEOS WGs and /or CEOS activities of some Members and Associates especially after the end of IGOS-P. One suggested an interim role of Observer / Visitor to test the real interest of the candidate in CEOS before being accepted either as definitive Member or Associates. The interest could be demonstrated through the participation to some WGs for instance.</p> <p>RECOMMENDATION: Opportunity of introducing a “testing period” to be escalated to CEOS Self Study Steering Committee.</p> |
| <p><u>Question 2.1:</u> what should be the best procedure for CEOS members to agree on the future major CEOS activities?</p> | <p>Resources: Several insisted on the need to guaranty sufficient support before starting any new activity: a champion supported by one or more CEOS Agencies.</p> <p>Parties involved: some proposed that it should be a collective decision involving at least CEOS Chair, SIT Chair, Secretariat, and CEO. SIT and Plenary meetings would be the place for the senior Agency reps to make a case for or against decisions like this.</p> <p>Vote: Majority of responses recommended that major activities are adopted by consensus.</p> <p>Process: it was suggested that the process for agreeing on future major CEOS activities should:</p> <ul style="list-style-type: none"> - be in line with the CEOS Strategic priorities |

| Survey Questions | Summary of responses received |
|--|---|
| | <ul style="list-style-type: none"> - allow timely decisions (i.e. not introduced delays in the initiatives to be served) - require just the minimum documentation necessary for the CEOS Principals to take their decisions - not block Agencies that are volunteer to participate but at the same time, allow Agencies not interested to stay out. - not endanger the execution of on-going strategic activities by removing resources. <p>RECOMMENDATION: Suggestions shall be used as inputs to the general CEOS discussion about the process to be adopted for agreeing on the future CEOS objectives and activities. Also related to the long-term strategic plan (see question 3.5)</p> |
| <p><u>Question 2.2:</u> are the current objectives and content the CEOS Work Plan adequate for managing the CEOS annual strategic activities ? If not, which improvements would be necessary ?</p> | <p>In general, members recognized the usefulness of having a Work Plan but several think that too much time is spent during the SEC telecom in addressing each point of the WP instead of focusing on major issues.</p> <p>RECOMMENDATION: CEOS to continue with the WP but CEOS telecons agendas to be focused only on major issues.</p> |
| <p><u>Question 2.2bis:</u> are the current objectives and content of the CEOS Implementation Plan adequate for managing the CEOS annual activities? If not, which improvements would be necessary?</p> | <p>Some noted that the current CEOS IP is focused exclusively on the GEO Work Plan. Instead they proposed an enlargement of the scope of the CEOS IP to address other activities non-directly related to a GEO task (e.g. work from the CEOS WGs, VCs, etc.</p> |

| Survey Questions | Summary of responses received |
|---|--|
| | <p>or supporting activities conducted outside the GEO framework for instance by some UN agencies.</p> <p>RECOMMENDATION: CEOS IP shall be enlarged to cover also the CEOS activities not explicitly related to GEO</p> |
| <p>Question 2.3: what should CEOS do to ensure a regular presence of its Members and Associates?</p> | <p>Some members noted that highly visible initiatives (e.g. IGOS, GEO, Virtual Constellations) have triggered interest / motivation of space agencies. They recommended continuing with this approach.</p> <p>Some suggested that CEOS leadership should also dynamically and creatively seek to involve those CEOS Agencies that are not participating and survey space agencies to understand their interests and expectations in joining CEOS</p> <p>The need to reduce the number of meetings involving the same persons and to prepare appealing agendas of policy relevance was mentioned by more than one team member.</p> <p>The above suggestions are aimed at increasing the involvement of space agencies. Someone even proposed repressive measures like suspending members that have failed to be present at two subsequent Plenaries !!!</p> <p>RECOMMENDATION: To be escalated to CEOS Self Study Steering Committee</p> |
| <p>Question 2.4: to ensure a proper functioning of CEOS, which meetings should be held, for which purpose and when ? What should be the</p> | <p>From the answers collected, it appears that for some team members, strategy shall be discussed at Plenary while for others it</p> |

| Survey Questions | Summary of responses received |
|--|---|
| attendance? | <p>should be addressed also during the SIT meetings. For instance, it was suggested by some to have the SIT really more focused on implementation and the Plenary on strategy with the presence of one senior technical SIT in spring and a Principals-led Plenary in fall. On the contrary, some others suggested that CEOS Principals shall be present also at the SIT meetings, even someone suggested to restrict the participation to the SIT meetings (“closed meetings”) by sending SIT invitations to a “shortlist”. Someone even suggested replacing the SIT meeting(s) by two CEOS Technical meetings.</p> <p>Eventually, the timing of the CEOS Plenary coinciding with the change of CEOS Chair and just before GEO Plenary and major environmental Conventions was reported by one person as a major issue. Besides, the fact that the preparation of the CEOS participation to those events through ad hoc meetings, sometimes without coordinating with the Plenary, Secretariat and CEO was perceived as an issue to be addressed.</p> <p>RECOMMENDATION:</p> <p>The respective objectives of both the SIT meeting(s) and the CEOS Plenary meeting need to be redefined and agreed. To be escalated to CEOS Self Study Steering Committee. CEOS attendance to major non-CEOS events, end of the year, shall also be discussed by CEOS.</p> |
| Question 2.5: do you think the current level of communication is adequate? | <p>The responses were divided between those who think that the level of efforts put in communication is sufficient and those who suggested an increase it by:</p> |

| Survey Questions | Summary of responses received |
|---|---|
| | <ul style="list-style-type: none"> - placing more up to date information on the CEOS web site. Two proposed to have the CEOS newsletter only electronic form on the CEOS web site - by publishing targeted one-pagers at major events like GEO, UNFCCC, event, or perhaps for Rio 2012, - by having CEOS speakers at side events organized around those major events - by better informing the scientific community of its activities (see also question 2.7bis below) <p>RECOMMENDATION: Through the responses to both questions 2.5 and 2.5bis, the team suggests the improvement of the CEOS communication to be further addressed by CEOS.</p> |
| <p><u>Question 2.5bis:</u> should the organization of the CEOS communication be improved? If yes, how?</p> | <p>Very few recommendations. One member recommended that the communication should target higher level meetings more strategically. It was suggested to either add to the CEOS Work Plan, a section dedicated to communication or to ask the CEO to prepare an annual communication plan.</p> <p>RECOMMENDATION: See recommendation for question 2.5 above.</p> |
| <p><u>Question 2.6:</u> is the current level of information adequate to ensure a proper sharing of information?</p> | <p>Overall, all members admitted that the current level of information is adequate</p> <p>RECOMMENDATION:</p> |

| Survey Questions | Summary of responses received |
|---|--|
| | No specific action needed. |
| <u>Question 2.6bis</u> : should the sharing of information among CEOS members be improved? If yes, how? | <p>No major recommendation</p> <p>RECOMMENDATION: No specific action needed.</p> |
| <u>Question 2.7</u> : should CEOS connect more often to major political events like G8 or G20? | <p>Unanimous positive answer. But CEOS involvement / message need must be well prepared in advance and CEOS needs to establish the right connection. Finding well connected space agency senior people seems to be the key to this. CEOS might connect more to some organizations like UNFCCC, IPCC, etc when the connection between those organisations and GEO is weak or inexistent.</p> <p>RECOMMENDATION: CEOS should connect more often to major political events but this requires a good preparation, with the right connection</p> |
| <u>Question 2.7bis</u> : what other political events should CEOS participate in ? | <p>Only a single suggestion !!! ...:</p> <p>Some large scientific conferences, e.g., AGU, COSPAR, the forthcoming PuP2012 (Planet under Pressure), could host some CEOS presence and deserve attention. The scientific community is not enough aware of CEOS activities and initiatives.</p> <p>RECOMMENDATION: It seems that CEOS should better inform in particular the</p> |

| Survey Questions | Summary of responses received |
|--|--|
| | scientific community about its activities and initiatives. This also related to the later suggestions for CEOS to improve its interface and communication with the scientific community (e.g. see questions 2.5 above and 3.4 below) |
| <u>Question 2.8:</u> are? | <p>By accident, the question was incomplete (my mistake !!). The context was about the CEOS SBA teams.</p> <p>Nevertheless some “responses” (!!) had been received: contribution from SBA teams is uneven. In general, the SBA coordinators perhaps have too much expectation thrust upon them; they do not have sufficient authority to be able to deliver from members all that the group as a whole expects of them. However, the usefulness of having CEOS SBA experts Coordinators was restated.</p> <p>A renewal of SBA Coordinators for some SBAs was suggested.</p> <p>RECOMMENDATION: Need and responsibilities of the CEOS SBA teams must be debated by CEOS.</p> |
| <u>Question 3.1:</u> what are the most successful past achievement of CEOS ? | <p>All responses stated that the most successful past achievements of CEOS are numerous. Support to initiatives (e.g. GCOS, GEO, FCT) were cited but also there were several mentions to the excellent work performed by CEOS bodies like WGISS, WGCV and the VCs.</p> <p>Some mentioned also the improvement of CEOS working methods (clearer objectives and definition of activities). For</p> |

| Survey Questions | Summary of responses received |
|---|--|
| | <p>several Members, the current external recognition as primary forum for outside agencies to address EO space agencies as a whole, and ability to deliver a coherent response to these, is also a considered as a success.</p> <p>RECOMMENDATION: Successful activities require among others, good specifications right at the start: CEOS to request clear and detailed requirements from the users that ask for CEOS' support.</p> |
| <p><u>Question 3.1bis:</u> what are some less successful past achievement of CEOS ?</p> | <p>Most of the criticisms addressed the internal functioning of CEOS such as:</p> <ul style="list-style-type: none"> • the lack of direction given in the past by the Plenary to the WGs that have conducted introspective actions for a long-time; mistake that is being reproduced with the VCs. • the ambiguous and vague role of SIT wrt Plenary and the consequence of having too many overlapping meetings without clear objectives was also mentioned. • the fact that a certain number of CEOS Members and Associates have become less active has also been reported as a failure. For instance, the “lack of effective participation of China and India in the VC initiative” was given as example by one member (in response to another question 3.5) <p>Only one critic regarding the low performance of CEOS in supporting a specific external action was mentioned: failure to act together on important issues such as open access to medium-</p> |

| Survey Questions | Summary of responses received |
|---|--|
| | <p>resolution EO data.</p> <p>RECOMMENDATION: CEOS Plenary shall redirect and better rely on its bodies like WGs, VC teams to support more efficiently the various CEOS activities</p> |
| <p><u>Question 3.2:</u> do you think the current CEOS coordination, aiming at removing unnecessary overlaps and filling gaps in response to users' needs, adequate?</p> | <p>While some stated that CEOS could do better (e.g. to better connect to the end user), several warned against being too much ambitious, considering the resources available today. A more efficient use of CEOS assets like VCs is needed and more rigorous working methods (e.g. CEOS to ask users for clear and detailed requirements). Someone wrote that filling gaps appeared to be more critical than removing overlaps.</p> <p>RECOMMENDATION: See recommendation for question 3.1bis above.</p> |
| <p><u>Question 3.3:</u> do you think that CEOS activities translate into benefits for its Members?</p> | <p>Several responses stated that committed members (vs less active ones) reap benefits. This is true for emerging space agencies. A better exchange of information and coordination are fundamental benefits for the members as not everything can be done by bilateral exchanges only; some examples resulting from successful CEOS cooperation were given: VCs, FCT / GFOI,</p> <p>RECOMMENDATION: No specific action needed.</p> |

| Survey Questions | Summary of responses received |
|---|--|
| <p><u>Question 3.4:</u> in addition to GEO, should CEOS consider other major global initiatives promoted by other instances like the G8, G20, etc .. when defining its goals and objectives ? What other initiatives do you consider relevant for CEOS?</p> | <p>Answers seems to diverge maybe due to the different appreciation from members in the capacity of GEO to embrace all the issues related to EO:</p> <ul style="list-style-type: none"> - NO: CEOS should focus only on GEO as GEO is supposed to address in theory, everything incl. UNFCCC activities and as G8 / G20 members are also GEO members. - YES with some care: the “unresolved tensions between GEO and UN organizations” for some members shows that, in practice, GEO does not address everything (contrarily to what is stated by partisans of “NO”). They recommend CEOS should respond to other international organizations, such as “WMO, FAO, UNFCCC, UNEP, UN Convention on Desertification” and technical activities such as science programs (WCRP, IGBP ...). <p>Yes but with some caveat: CEOS has already its abilities in many users, and has to assess carefully its abilities in taking new commitments. Requests from G8, G20 are judged as being often vague.</p> <p>RECOMMENDATION: To discussed by CEOS. Escalated to Steering Committee</p> |
| <p><u>Question 3.5:</u> in addition to the short /midterm goals and objectives defined annually, would CEOS need to define some strategic goals and objectives covering the next 5 years (for instance 5-year strategic plan revised annually)?</p> | <p>All responses agreed on the necessity for CEOS to develop a multi-year plan (5-year was recommended by the majority). For instance, it was suggested that CEOS should be proactive in defining its participation in the future of GEOSS beyond 2015.</p> |

| Survey Questions | Summary of responses received |
|--|--|
| | RECOMMENDATION: CEOS to prepare a 5-year strategic plan. |
| <u>Question 3.6:</u> in which major activities and initiatives should CEOS be involved in the next few years? In the next 3-5 years? In the next 10 years? | Several suggestions around climate change-related initiatives and organizations (e.g. REDD, IPCC, GCOS, “climate architecture”) supported by activities already being looked at by CEOS groups (e.g. cal/ val, interoperability, open data access, VCs, GEO GCI) RECOMMENDATION: Continue to support the climate change-related initiatives as well as the major activities undertaken by the CEOS WGs and VCs. |

Conclusions

The responses received demonstrate a good knowledge of CEOS by the team members. The survey shows also that there is in general a shared view on what CEOS should do in the future and how it should do it. Several good comments, ideas and suggestions have been collected and in many cases they constitute very useful inputs to the on-going CEOS brainstorming about its future.

Annex A “Individual Responses”

List of questions

Hyperlinks to the detailed individual responses

- Question 1.1: Are the current start date and duration of CEOS Chair term satisfactory? If not, how long do you think the mandate should be?
- Question 1.2: Are the current start date and duration of CEOS SIT Chair term satisfactory ? If not, how long do you think the mandate should be?
- Question 1.3: Are the responsibilities of the CEOS Chair satisfactory for the good functioning of CEOS ?
- Question 1.4: Are the current composition (ESA/EUMETSAT, NASA/NOAA and MEXT/JAXA, CEOS Chair) and responsibilities of the CEOS Secretariat satisfactory ?
- Question 1.5: Is the current schema of voluntary contribution based on a best effort basis sufficient to ensure the successful execution and timely completion of the CEOS activities?
- Question 1.6: are the current entities dedicated full time to CEOS (CEO and SEO) sufficient to ensure a proper functioning of CEOS?
- Question 1.7: is the current term duration (2 years) for the CEO position adequate? If not what should it be?
- Question 1.7bis: are terms of reference for the CEO position needed?
- Question 1.8: are the current criteria for accepting new CEOS Members and Associates adequate? If not, should we have less stringent criteria or on the contrary more rigid ones and which ones?
- Question 2.1: what should be the best procedure for CEOS members to agree on the future major CEOS activities?
- Question 2.2: are the current objectives and content the CEOS Work Plan adequate for managing the CEOS annual strategic activities ? If not, which improvements would be necessary ?
- Question 2.2bis: are the current objectives and content of the CEOS Implementation Plan adequate for managing the CEOS annual activities? If not, which improvements would be necessary?
- Question 2.3: what should CEOS do to ensure a regular presence of its Members and Associates?

| | |
|--|--|
| <p><u>Question 2.4:</u> to ensure a proper functioning of CEOS, which meetings should be held, for which purpose and when ? What should be the attendance?</p> <p><u>Question 2.5:</u> do you think the current level of communication is adequate?</p> <p><u>Question 2.5bis:</u> should the organization of the CEOS communication be improved? If yes, how?</p> <p><u>Question 2.6:</u> is the current level of information adequate to ensure a proper sharing of information?</p> <p><u>Question 2.6bis:</u> should the sharing of information among CEOS members be improved? If yes, how?</p> <p><u>Question 2.7:</u> should CEOS connect more often to major political events like G8 or G20?</p> <p><u>Question 2.7bis:</u> what other political events should CEOS participate in ?</p> <p><u>Question 2.8:</u> are?</p> <p>z</p> <p><u>Question 3.1:</u> what are the most successful past achievement of CEOS ?</p> <p><u>Question 3.1bis:</u> what are some less successful past achievement of CEOS ?</p> <p><u>Question 3.2:</u> do you think the current CEOS coordination, aiming at removing unnecessary overlaps and filling gaps in response to users' needs, adequate?</p> <p><u>Question 3.3:</u> do you think that CEOS activities translate into benefits for its Members?</p> <p><u>Question 3.4:</u> in addition to GEO, should CEOS consider other major global initiatives promoted by other instances like the G8, G20, etc .. when defining its goals and objectives ? What other initiatives do you consider relevant for CEOS?</p> <p><u>Question 3.5:</u> in addition to the short /midterm goals and objectives defined annually, would CEOS need to define some strategic goals and objectives covering the next 5 years (for instance 5-yeat strategic plan revised annually)?</p> <p><u>Question 3.6:</u> in which major activities and initiatives should CEOS be involved in the next few years? In the next 3-5 years? In the next 10 years?</p> | |
|--|--|

| | |
|---|--|
| <p>1. <u>Question 1.1:</u> Are the current start date and duration of CEOS Chair term satisfactory? If not, how long do you think the mandate should be?</p> <p><Back to section "Survey Results"></p> | |
| Respondent 1 | |
| Respondent 2 | As the responsibilities of CEOS increase, it is worth considering a two-year term of office for the Chair, with handover alternating with that of SIT (i.e. in alternate years). One should also question whether the wide range of agencies which |

| 1. <u>Question 1.1:</u> Are the current start date and duration of CEOS Chair term satisfactory? If not, how long do you think the mandate should be? | |
|--|--|
| | <Back to section "Survey Results"> have taken the Chair in the past is still appropriate given the increased resources needed to cope with the fuller workload. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | I see no serious reason to change the current status in that respect. |
| Respondent 6 | |
| Respondent 7 | I think it would be helpful for the Chair to have a two year mandate. |
| Respondent 8 | |
| Respondent 9 | Yes. The current start date and one year with TROIKA system are adequate as far as the Plenary is held in October or November. |
| Respondent 10 | the start date and current duration are satisfactory given the amount of time and resources that have to be brought by the CEOS Chair. The current start date is OK as aligned with both the CEOS and GEO Plenaries. A longer duration term might refrain potential volunteers for future Chairmanship. On the other hand, a two year term in phase opposition with the SIT Chair would guaranty a continuity in CEOS has the two would never rotate the same year. Without considering the problem of resources availability, a 2-year term for the CEOS Chair would be better. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | The CEOS Chair one-year tenure, geographical rotation, identification of future Chairs two years in advance, and involvement of future and past chairs in the CEOS Troika, is in my view working quite well. A number of CEOS Agencies, both from developed and developing countries have had their turn in leading CEOS. (One problem situation occurred when Spain decided very late that it could not assume the chairmanship it had previously agreed to.) The start date for each annual CEOS chairmanship coincides with the Plenary organized and chaired by the previous Chair, and this |

| 1. <u>Question 1.1:</u> Are the current start date and duration of CEOS Chair term satisfactory? If not, how long do you think the mandate should be? | |
|--|---|
| | <p><Back to section "Survey Results"></p> <p>is an issue that should be addressed. A Plenary in the September or October time frame would provide the opportunity for the new Chair and Chair agency to be in place for a few weeks before the annual GEO Plenary and UNFCCC COP that CEOS needs to take active roles in. With the CEOS Plenary most often occurring in November---just days prior to GEO Plenary and UNFCCC COP) it has made sense for the previous Chair and Chair Agency to continue at least a co-leadership role for CEOS in these two events.</p> |
| Respondent 14 | Yes |
| Respondent 15 | Since the effort in organizing CEOS is based on voluntary contribution from member agencies, the one year duration of the mandate is right. Extending this mandate would put a large burden on member agencies from emerging countries. Starting the mandate at Plenary also is appropriate. |
| Respondent 16 | It's a practical compromise – any longer and we would struggle to get volunteers beyond the largest of agencies. But it raises continuity issues – which I address below. |

| 2. <u>Question 1.2:</u> Are the current start date and duration of CEOS SIT Chair term satisfactory ? If not, how long do you think the mandate should be? | |
|---|---|
| Respondent 1 | |
| Respondent 2 | Current term is fine, to combine with that of CEOS Chair as above. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Same as above. (i.e. “I see no serious reason to change the current status in that respect.”) |

| 2. <u>Question 1.2:</u> Are the current start date and duration of CEOS SIT Chair term satisfactory ? If not, how long do you think the mandate should be? | |
|---|--|
| Respondent 6 | |
| Respondent 7 | Two years is fine, but if the CEOS Chair is also 2 years, one must be careful to avoid them both changing at the same time. |
| Respondent 8 | |
| Respondent 9 | Yes. Two years with the two years Vice Chair term is appropriate to keep the continuity and viability of its leadership in a voluntary base system. |
| Respondent 10 | The start time is OK. The duration cannot be less than 2 years so that strategic activities can be defined, started and some completed. There could be an advantage to have a term that lasts more than 2 years but then, it would result in an extra burden on the SIT team. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | SIT Chairs actually have a four-year involvement: two years as SIT ViceChair then two years of tenure as SIT Chair. This, I believe is working very well, though in some cases the SIT Vice-Chair has left the scene (as with Horikawa retirement) before becoming SIT Chair but their agency has always stepped in to ensure a successor. The start date situation is similar to that of the CEOS Chair noted above; however, it is not such an issue since the incoming SIT Chair has already been serving as Vice-Chair and is familiar with the issues: this presupposes that the SIT Chair and Vice-Chair maintain good contact |
| Respondent 14 | Yes. |
| Respondent 15 | I consider that SIT should be replaced by a new organization better suited to CEOS current role as the main forum for Earth observation matters related to the space agencies. Having a SIT Chair creates a double hierarchy. The IT chair rotates only inside the four agencies from developed countries (NOAA, NASA, JAXA and ESA) and this creates a problem of governance for CEOS. A SIT chair alongside a CEOS chair is unsatisfactory. The CEOS Chair should be the Chair of the SIT. In fact, the SIT meetings have evolved from being |

| | |
|--|---|
| <p>2. <u>Question 1.2:</u> Are the current start date and duration of CEOS SIT Chair term satisfactory ? If not, how long do you think the mandate should be?</p> | <p>a technical meeting with few agencies to an attendance that includes a significant number of CEOS member agencies. Thus, we should abolish the role of the SIT Chair.</p> <p>SIT meetings focus on long-term activities carried out by technical teams, for example in the virtual constellations initiative. The idea was good: to have meetings dedicated to technical matters that would not be right for the Plenary. However, the role of CEOS in GEO has now taken over the role previously assigned to SIT. Many of the tasks that started as SIT initiatives have now become part of the GEO Work Plan as tasks where CEOS takes a leading role. Also, the tasks of the GEO Work Plan prevail over the SIT tasks. Much of the effort of the CEOS member agencies in efforts such as Forest Carbon, Capacity Building, Climate, Virtual Constellations is now part of the tasks we lead in GEO.</p> <p>Taking part in the GEO meetings demands a large investment from CEOS member agencies. Recognizing the intersection between CEOS and GEO, we need to reduce the number of CEOS meetings and to increase intersection and cooperation between the agencies. Thus, I propose SIT meetings be replaced by CEOS technical meetings, dedicated to oversee the tasks CEOS agencies are engaged, either as part of GEO Work Plan or as part of CEOS activities. Technical meetings would be co-located with meetings of the CEOS WGs and CEOS virtual constellation teams, so that these meetings would be focused on technical matters, and would reduce the need to travel. A possible deal could be: April-May: 1st CEOS Technical Meeting, co-located with WGISS and WGEdu, and part of the virtual constellations meetings. August-September : 2nd CEOS Technical Meeting, co-located with WGCV and WGClimat, and part of the virtual constellations meetings. : CEOS Plenary, where the results would be presented and the plan for the next year be approved.</p> |
| <p>Respondent 16</p> | <p>Yes it seems about right to allow significant achievement without undue influence over too long a period.</p> |

| | |
|--|---|
| <p>3. <u>Question 1.3:</u> Are the responsibilities of the CEOS Chair satisfactory for the good functioning of CEOS ?</p> | |
| <p>Respondent 1</p> | |
| <p>Respondent 2</p> | <p>I believe this is adequate for the moment.</p> |

| 3. <u>Question 1.3:</u> Are the responsibilities of the CEOS Chair satisfactory for the good functioning of CEOS ? | |
|---|---|
| | |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Yes. |
| Respondent 6 | |
| Respondent 7 | The texts are OK – everything depends on the personalities of the Chair and the SIT Chair. As written a weak Chair loses control to the SIT Chair, but I don't think this can be avoided by altering the text. |
| Respondent 8 | |
| Respondent 9 | Current situation had no problem from the viewpoint of the organization system. |
| Respondent 10 | In practice, the responsibilities of both the CEOS Chair and the SIT Chair sometimes overlap. For instance, at the last CEOS Plenary, presentations by both Chairs included references to CEOS strategic priorities (Forest Carbon Tracking", "Global Monitoring of Greenhouse Gases from Space", "Data Democracy" and "Climate Change"). If both groups (CEOS Chair team and CEOS SIT team) work on the definition of the CEOS top priorities, there might be a risk of divergence. However the SIT ToR do not mention the definition of a CEOS strategy. As currently written the ToR are more of implementation type. The ToR of the CEOS Chair are embedded in the CEOS ones. Clear and distinct of ToR for both CEOS Chair and SIT Chair should be reviewed / enhanced. It should be made clear that one decides while the other implements. This is the theory ... In practice, some flexibility in "some" attribution of responsibilities should be allowed to take advantage of the different strengths of both teams to overcome some potential weakness. Another possibility to strengthen both teams would be to have a deeper involvement of vice-Chair teams assisting the Chair Teams. This is the model used by WGISS and WGCV for which the WG Chair is well seconded by the Vice-Chair (future Chair of the WG) |
| Respondent 11 | |
| Respondent 12 | |

3. Question 1.3: Are the responsibilities of the CEOS Chair satisfactory for the good functioning of CEOS ?

| | |
|----------------------|--|
| Respondent 13 | Yes, in general terms. It is VERY important though that the incoming CEOS Chair (identified fully two years in advance) takes an active role in the Troika and makes plan within their Agency to develop a core leadership team (whether or not they choose to also rely on consultants such as Stephen Ward/George Dyke) who will take an active part in the CEOS Secretariat BEFORE and DURING the Chair's tenure. The CEOS Chair needs to work closely with the SIT Chair, of course, through at least monthly coordination telecom meetings. The CEOS Chair, per CEOS TOR and practice, has overall leadership responsibility, and it is important that the CEOS and SIT leadership (that also comprises SIT Vice-Chair and Troika) work well together with clearly outlined responsibilities that result in mutual support. |
| Respondent 14 | With the evolution in recent years of the work carried out by the CEOS (VCs, SBA teams, WGs and subgroups) the theoretically clear distinction between the roles CEOS chair and the SIT chair has been degraded. The contents of SIT and plenary meetings are now very similar – high level reporting on these diverse activities carried out throughout the structure. We would suggest a profound reappraisal of the roles of each level within CEOS – technical working groups and subgroups which carry out the projects, overview by SIT who takes a higher level and longer term view (less reporting and more focused on new potential activities, on relationship with GEO etc) followed by the plenary meeting to ensure that the work done is in keeping with agency policy. |
| Respondent 15 | I have discussed the item in my response to question 1.2 above. In synthesis, the CEOS Chair should be responsible for all CEOS activities during his year of tenure, supported by the CEO and SEO staff. The SIT Chair creates a double hierarchy and reduces the importance and the role of the CEOS Chair. |
| Respondent 16 | Yes. The efficacy is in fact determined by the capacity and ability of the Chair team applied to the task. In recent years this has been more than adequate |

| 4. <u>Question 1.4:</u> Are the current composition (ESA/EUMETSAT, NASA/NOAA and MEXT/JAXA, CEOS Chair) and responsibilities of the CEOS Secretariat satisfactory ? | |
|--|--|
| Respondent 1 | |
| Respondent 2 | Probably OK. A wider group would be unmanageable, while fewer would be open to question. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Extending the composition of the Secretariat to involve the newcomers (China and India) and possibly Russia, which is now coming back on stage, seems desirable. I do not see clearly how to do this without making the Secretariat functioning too heavy. Some rotation in the European and Asian representation could be considered. I think this would help those countries play a more active role in CEOS and entrain them better in the international mood of free and open data access. |
| Respondent 6 | |
| Respondent 7 | It is hard to change the present arrangements without falling into the trap of having a Secretariat which represents all geographical areas. It works reasonably well as it is |
| Respondent 8 | |
| Respondent 9 | From the view point of the number of participating agency current 5+Troika and its geographic balance are adequate. In terms of its responsibility, or role, of the SEC seems adequate including having monthly telecon and face to face meeting in the occasion of major meetings |
| Respondent 10 | CEOS SEC seems to work fine as the participation from those agencies has always been guaranteed (so far !!) |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | The standing CEOS Secretariat has worked very well, in my opinion, since its inception in 1992, with Secretariat agencies generally fully involved and making key contributions. The monthly Secretariat telecon or meeting, chaired by the CEOS Chair Agency, and including the SIT Chair and the WG Chairs is a key implementing component of CEOS. It works best |

| | |
|---|---|
| 4. <u>Question 1.4:</u> Are the current composition (ESA/EUMETSAT, NASA/NOAA and MEXT/JAXA, CEOS Chair) and responsibilities of the CEOS Secretariat satisfactory ? | |
| | when the CEOS Chair Agency provides active leadership. |
| Respondent 14 | Yes |
| Respondent 15 | Support from ESA/EUMETSAT, NOAA/NASA and MEXT/JAXA is much appreciated by the CEOS community. In practice, this is the CEOS equivalent to the permanent members of the UN Security Council. I wonder if the time has come to broaden the membership of the Secretariat to member agencies from emerging economies, such as the BASIC group (Brazil, South Africa, India, China). These space agencies should be encouraged to assign full-time resources to CEOS. |
| Respondent 16 | Yes – the effectiveness has waxed and waned according again to the personnel assigned but I see the SEC as being quite experienced and informed in general. We should encourage full attendance. This includes incoming Chairs – even 2 years ahead might be helpful. And WG Chairs. WGClimat has rarely shown at SEC since its inception. |
| 5. <u>Question 1.5:</u> Is the current schema of voluntary contribution based on a best effort basis sufficient to ensure the successful execution and timely completion of the CEOS activities? | |
| Respondent 1 | |
| Respondent 2 | Difficult to see how CEOS could deal with other forms of contribution without a very major review of procedures and legal status. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Yes, as long as existing voluntary contributions are more or less stable and as new contributors add to the pot on top of those already involved. |

| | |
|---|---|
| 5. <u>Question 1.5:</u> Is the current schema of voluntary contribution based on a best effort basis sufficient to ensure the successful execution and timely completion of the CEOS activities? | |
| Respondent 6 | |
| Respondent 7 | We tried on several occasions to institute obligatory contributions, but they all failed. I think CEOS, by its very nature, is doomed to continue to rely on voluntary contributions |
| Respondent 8 | |
| Respondent 9 | The current scheme based on the voluntary contribution is essential for CEOS as a coordination body. If a project which requires the committed resource and responsibility, a formal agreement will be needed. |
| Respondent 10 | currently “voluntary contribution” is provided at different levels, depending on both the agencies and activities. For instance, some agencies are taking strong engagement in supporting CEOS positions with staff working dedicated part time (e.g. Chair / SIT teams, WG Chairs, ...) or (near) full-time (e.g. CEO,...). Same for the activities (e.g. provision of data for FCT). The current voluntary contribution reflects also the degree of interest from each CEOS Member for a specific activity and this should be respected. A compulsory contribution would go against that principle of free decision for supporting a particular activity. Then it would raise the many issues related to the management of a fund / budget. As a conclusion, current voluntary contribution mechanism seems to be the easiest model to adopt, |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Given the recognized importance and value of CEOS in its key connections to GEO and UNFCCC/SBSTA, I believe that many (though certainly not all) CEOS Agencies are motivated to follow through and actively contribute to ongoing CEOS activities. Required subscriptions (as with UN Agencies, IAF, etc.) would, in my opinion, not work well. CEOS, as such, is an international coordination mechanism that very much depends on the active involvement of agencies and in having at least a “quorum” that allows meaningful progress. If interest and activity lags, as has, I believe, happened right now with the WGEdu, then the voluntary aspect is less successful. With WG’s and Constellations, greater effort needs to be made by Chairs, Co-Leads and the overall CEOS leadership (Chair and Secretariat) to encourage broader CEOS Agency |

| 5. <u>Question 1.5:</u> Is the current schema of voluntary contribution based on a best effort basis sufficient to ensure the successful execution and timely completion of the CEOS activities? | |
|---|--|
| | active participation. |
| Respondent 14 | "Best effort" basis should continue to prevail |
| Respondent 15 | CEOS plays an important role in support GEO in building GEOSS. In many GEO tasks, CEOS is a leader. They demand a lot of work, especially for the CEOS CEO. These tasks demand a permanent secretariat. CEOS member agencies could consider some options to create such a secretariat: (a) in-kind contributions of experts that could be 100% dedicated to CEOS and work in a cooperative way from their home office; (b) one permanent team in Geneva, where it could interact directly with GEO and with the WMO. |
| Respondent 16 | I see no alternative. International coordination is a second tier priority to domestic agendas and budgets. The status of CEOS is unlikely to change or to become an intergovernmental body. Even that is no guarantee of resources as a dwindling GEOSEC shows. What has determined CEOS success has been having sufficiently focused challenges and champions to drive them individually. With the right incentives agencies can divert their coordination budgets to help CEOS meet its goals. Our limitation is only in finding processes (like the VCs) which appeal to agency heads to encourage them to do this. Having appealing programmes that attract voluntary coordination monies is what CEOS should focus on. |

| 6. <u>Question 1.6:</u> are the current entities dedicated full time to CEOS (CEO and SEO) sufficient to ensure a proper functioning of CEOS? | |
|--|---|
| Respondent 1 | |
| Respondent 2 | Generally yes, although this depends on the roles expected. |
| Respondent 3 | |

| 6. <u>Question 1.6:</u> are the current entities dedicated full time to CEOS (CEO and SEO) sufficient to ensure a proper functioning of CEOS? | |
|--|---|
| Respondent 4 | |
| Respondent 5 | My appreciation in 2007, after one year as the first CEO, was that two full-time people would be necessary to properly ensure CEO growing functions. This workforce seems now in place. For the SEO, I do not really know. My impression is that one or two full time persons, granted with access to enough ad hoc support, either through a money pot or through in-kind contributions from space agency technical staff, could make it. |
| Respondent 6 | |
| Respondent 7 | If CEOS takes on some specific tasks, there will need to be reinforcements. |
| Respondent 8 | |
| Respondent 9 | The functions of CEO and SEO should be mainly coordination (though SEO provides some technical support and tools), while grouped of experts such as Working Groups, Virtual Constellations and Task Force should create actual CEOS outcomes. The current entities are well balanced to the present CEOS activity level. |
| Respondent 10 | at the occasion of the recent renewal of the CEO, the CEO-related resources have been augmented. The two previous CEOs (Jean-Louis and Ivan) used to regularly recommend an increase of the CEO-related resources. Wait for the next CEOS Plenary to see whether this is sufficient or not |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | The CEO (and current CEO/DCEO arrangement) and SEO are functions, with able incumbents (and predecessors in the case of CEO) that are working well. A proposal to instead have a permanent paid Secretariat was not approved at the 2006 Buenos Aires Plenary and the alternative of having a CEO, buttressed by the development of the SEO, has been a better solution to what CEOS needs. Both CEO and SEO are able to provide skilled/committed support. Contrast this, for example, with the GEO Secretariat which has to rely on secondments----often very good people but a permanent situation of turnover/succession and also now the highly politically charged issue of selecting the Secretariat Director. |

| 6. <u>Question 1.6:</u> are the current entities dedicated full time to CEOS (CEO and SEO) sufficient to ensure a proper functioning of CEOS? | |
|--|--|
| Respondent 14 | It may not be ideal but significant progress has been made during recent period. A clear mandate should be written. |
| Respondent 15 | No! CEOS has a now become a truly global organization and is recognized as relevant by institutions such as UNFCCC, WMO, FAO and GEO. Open access data has now come of age. Scientists and policy-makers worldwide recognize the need for earth observation data. Space agencies recognize the benefits of cooperation. All of this adds to one conclusion: CEOS needs a permanent secretariat, with full-time members. Too much work for the CEOS and SEO to handle alone. Creating a full-time CEOS Secretariat should be discussed in detail by the member agencies. In responding to item 1.5, I have outlined some options. Best is to locate the CEOS Secretariat in Geneva, interacting with GEO and WMO. A CEOS secretariat located in Geneva would avoid the current triplication of efforts that exist between CEOS, the GEO Secretariat, and WMO CGMS. WMO would provide the physical and management infrastructure. In return, CEOS SEC would coordinate the activities now done by the GCMS. CEOS SEC would also follow up closely on the relevant tasks of the GEO Work Plan. CEOS SEC needs a small staff of about 4-5 people, that could be seconded experts from member agencies, under the coordination of a CEO. |
| Respondent 16 | In their own capacities and domains the roles have been extremely productive. I would say the assignment of 2 people to the CEO role needs more thought and more could be done with those people in 2011 and 2012 – including more priority setting and long term planning for CEOS. |

| 7. <u>Question 1.7:</u> is the current term duration (2 years) for the CEO position adequate? If not what should it be? | |
|--|--|
| Respondent 1 | |
| Respondent 2 | The current role sees the CEO as a servant of the Chair and organisation more generally, and not as a leader. In such a circumstance two years is probably right. This would need to be reviewed of the role were to change significantly. |

| 7. <u>Question 1.7: is the current term duration (2 years) for the CEO position adequate? If not what should it be?</u> | |
|--|--|
| | I would not rule out a change to a higher level position with a different role re CEOS – more representative and leading - and this might need a different term, inter alia. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | 2 years is OK, provision for one year renewal would be good, with overlap with an identified successor. |
| Respondent 6 | |
| Respondent 7 | I would go for a three year mandate for the CEO. For CEOS, as a general rule, I'm not in favour of a lot of rules and regulations. Just enough to ensure that the mechanism works, but not enough to encourage long debates in Plenary which distract from the main focus of CEOS work. |
| Respondent 8 | |
| Respondent 9 | It would be preferable to assign CEO term of duration more than 2 years in practical in order to ensure the continuity and coordination based on the CEOS history. It might be good for smooth extension for CEOS assignment more than 2 years. |
| Respondent 10 | 3 years might be more appropriate as: <ul style="list-style-type: none"> - it ensures a better continuity as not coupled to the SIT Chairmanship rotation (2 years) - it might take several months for the CEO to be fully operational. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Yes, but given potential coverage/travel demands for CEOS-related functions, it can have serious resource consequences for the Agencies that provide the CEO (and DCEO) I suggest the need to study this situation and have agreed roles, as well as limits, on what the CEO (CEO/DCEO) and CEOS itself can realistically undertake. |
| Respondent 14 | This seems short and is significantly shorter than the actual time spent in position by the last two holders of this job. The |

| 7. <u>Question 1.7:</u> is the current term duration (2 years) for the CEO position adequate? If not what should it be? | |
|--|---|
| | CEO role has clearly been an “anchor-man” role over the past 10 years for CEOS and should provide a certain continuity across rotating CEOS chairs and CEOS SIT chairs. |
| Respondent 15 | See above. The CEO needs at least a three year mandate, renewable for at least another 3 year period. The CEO would lead a full-time CEOS Secretariat, hosted in WMO (Geneva) to carry out the many daily matters of CEOS |
| Respondent 16 | : It's a manageable prospect for donor agencies to contemplate – so yes. This is the reality. Any longer would create a staffing disconnect for the volunteer and his/her host agency |

| 8. <u>Question 1.7bis:</u> are terms of reference for the CEO position needed? | |
|---|--|
| Respondent 1 | |
| Respondent 2 | ToR are always needed for anything or else confusion reigns. Whether the CEO is paired with SIT or CEOS Chair is tbd. A three year rotation would resolve this by not being aligned to either and may be an argument for it. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Actually “interim” Terms of reference for the CEO were adopted following the creation of this position at the CEOS Plenary in Buenos Aires. These ToRs are somewhere in my archive. They certainly need a revision. New ToRs should at least be based on initial definition + explicit rules for duration/rotation. Pairing with SIT Chair does not seem necessary to me (on the contrary, alternation could be better, and things would become complicated if the duration is not the same). |
| Respondent 6 | |
| Respondent 7 | |

| 8. <u>Question 1.7bis:</u> are terms of reference for the CEO position needed? | |
|---|---|
| Respondent 8 | |
| Respondent 9 | No. There has not been any particular issue caused by the absence of CEO ToR in the meantime. |
| Respondent 10 | Yes |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | TOR for the CEO would be helpful. If a DCEO were to succeed as CEO, that would entail a 4-year commitment for that individual and agency (similar to the SIT Vice-Chair, then Chair 4 year commitment) which is probably not realizable. The CEO succession, like the SIT leadership succession, will likely require the willingness of CEOS Agencies (and likely the large agencies that serve on the Secretariat) to field candidates and thus ensure continuity within CEOS. |
| Respondent 14 | Yes |
| Respondent 15 | Yes. There should be terms of reference for the CEO and for the CEOS Secretariat, as proposed above. |
| Respondent 16 | Definitely. More could be made of the role – particularly in light of the 2 people now available. We are at a phase of CEOS development where many new proposals are coming through and we need a screening process where key CEOS staffs are actively managing their selection. The CEO could do this. |

| 9. <u>Question 1.8:</u> are the current criteria for accepting new CEOS Members and Associates adequate? If not, should we have less stringent criteria or on the contrary more rigid ones and which ones? | |
|---|--|
| Respondent 1 | |
| Respondent 2 | Broadly speaking these are OK. We should welcome a broad membership but ensure that all members and associates are |

| 9. <u>Question 1.8:</u> are the current criteria for accepting new CEOS Members and Associates adequate? If not, should we have less stringent criteria or on the contrary more rigid ones and which ones? | |
|---|--|
| | active. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Still adequate. |
| Respondent 6 | |
| Respondent 7 | I would be inclined to leave things as they are. |
| Respondent 8 | |
| Respondent 9 | Yes. The current version of criteria would be adequate. |
| Respondent 10 | they are not too rigid |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | The TOR criteria are, I believe, still relevant and adequate . Of greater concern is whether interested agencies (for either Member of Associate status) are fully willing and able to become actively engaged. CEOS has a number of inactive Members. Certainly, with the completion of IGOS Themes and termination of the IGOS partnership, CEOS has lost the participation of the majority of the Associates who actively took part during the days of IGOS (the WMO is or course an exception here). One possibility would be to ask those interested in affiliated with CEOS to participate in at least one Plenary and to also join WGs, Constellations, in a type of observer role (either classified as an Observer or a visitor) BEFORE they are then voted to be a Member at a subsequent Plenary. |
| Respondent 14 | Yes |
| Respondent 15 | Yes. This criteria has enabled many agencies to join CEOS and make significant contributions. |

| | |
|---|--|
| 9. <u>Question 1.8:</u> are the current criteria for accepting new CEOS Members and Associates adequate? If not, should we have less stringent criteria or on the contrary more rigid ones and which ones? | |
| Respondent 16 | Yes. |
| 10. <u>Question 2.1:</u> what should be the best procedure for CEOS members to agree on the future major CEOS activities? | |
| Respondent 1 | |
| Respondent 2 | Very difficult and the place where GEO breaks down. Some minimum support form more than one (minimum number?) agency should be ensured before taking on any task, with rules of engagement developed, but I do not know what. We made a good start with the VCs and their definitions (thanks mainly to S Ward) but these are tending to proliferate – to excess perhaps? We must find an answer to this point as it could lead to the downfall of CEOS if new pet ideas from one or two agencies become formal actions. Maybe we need some sort of consensus within a WG/SIT or something. I am afraid I cannot offer a pat solution. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Any such procedure should be adopted by consensus by the Plenary. I do not feel now in a position to provide advice about the “best” procedure. The role of the CEO (to be defined in the revised ToRs) should be – as done by the Executive in any similar organization – to prepare a proposal, in consultation with the CEOS chair, the Secretariat and the SEO, to be submitted for adoption by the Plenary. |
| Respondent 6 | |
| Respondent 7 | The main qualification for a new project is that it has sufficient potential support to ensure that it will be carried through successfully. SIT is the obvious vehicle for examining new projects, but Plenary should lay down a few basic rules on which SIT should operate. |

| 10. <u>Question 2.1:</u> what should be the best procedure for CEOS members to agree on the future major CEOS activities? | |
|--|---|
| Respondent 8 | |
| Respondent 9 | <p>Current process to review and discuss at SIT meeting should be adequate for its lucidity and simplicity.</p> <p>Basically, the SIT meeting and Plenary are the only occasion for the face to face meeting in Principal level. And as SIT is responsible for “Play(ing) a central role in coordination of existing and future missions of CEOS agencies”, it is reasonable to maintain the current procedure to agree on the future activities. Each member agency has an opportunity to comment on the proposed activities at the SIT meeting.</p> |
| Respondent 10 | <p>The process for agreeing on future major CEOS activities should:</p> <ul style="list-style-type: none"> ▪ be in line with the CEOS Strategic priorities ▪ allow timely decisions (i.e. not introduced delays in the initiatives to be served) ▪ require just the minimum documentation necessary for the CEOS Principals to take their decisions ▪ not block Agencies that are volunteer to participate but at the same time, allow Agencies not interested to stay out. ▪ not endanger the execution of on-going strategic activities by removing resources. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | <p>Coordinated support for CEOS agreement to proceed on future new activities would require, in my opinion, the support of the CEOS and SIT Chairs, Secretariat and CEO. CEOS has of course made major commitments in connection with GEO, GCOS and UNFCCC/SBSTA and would therefore need to strongly consider future requests from these entities (such as next GCOS Implementation Plan, GEO request for involvement with Superites, etc.) as we have been doing. Also to take into account is the likelihood that incoming CEOS Chairs may want to identify a particular focus for their chairmanship (e.g. South Africa/GISTDA/INPE wanted to focus and then subsequently build on Data Democracy. And if CEOS is continues to be perceived as the “go to” organization, we are likely to get a lot of other requests, suggestions for new CEOS Constellations, etc. Worthy and compelling as these proposals for CEOS involvement might be, there could come a saturation point, and CEOS should have an understanding as to what its priorities are and thus how to handle incoming</p> |

10. Question 2.1: what should be the best procedure for CEOS members to agree on the future major CEOS activities?

| | |
|----------------------|--|
| | requests. As noted above, I believe that this would require a collective decision involving CEOS Chair, SIT Chair, Secretariat, and CEO. |
| Respondent 14 | CEOS must remain focused on technical and coordination activities relating to satellite systems. While the data acquired by these systems is at the heart of CEOS' role, as a priority it should focus on the access to (interoperable data systems – WGISS) and the utility of (CalVal) datasets. VCs represent an opportunity to bring these two keys elements together for the provision of data to users for specific physical parameters acquired by satellite systems. CEOS should not stray too far from these pillars, for example toward application orientated work where the applicability to many agencies is diluted. The most appropriate procedure for deciding on future activities has been, and should remain, debate at CEOS SIT and vote (if required) at plenary. It may be necessary to improve the capacity of the organisation to react to events or requests that appear between plenary meetings. Potential electronic solutions to accommodate debate and vote should be examined. |
| Respondent 15 | CEOS should follow the example of other international organization such as those on the UN system (WMO, UNFCCC) or outside (GEO) where a consensus needs to be reached for adoption of major decisions |
| Respondent 16 | GEO has suffered significantly from being unable to refuse any idea which any member or PO offers – good or bad. CEOS should not fall into this trap and I see a risk on this at the moment. It would help to have a multi-year work plan which has some indication of resourcing and champions of each major activity. In fact I proposed this during the CEOS Task Force in 2005 and 2006 and we considered it briefly but it never took off. I suggest we revisit the idea with a view to identifying strategic objectives on a 3 year timeframe for CEOS – with clear outcomes and at least an outline assessment of where the resources will come from and a commitment from the supporting agencies. CEOS SEC, with SIT Chair and CEOS Chair included as well as CEO etc seems the best place to debate on what could and should be taken on. Criteria should be established as a screening support, including whether a champion agency exists and sufficient other support to consider it to be a CEOS and not a unilateral activity. Finally the SIT and Plenary meetings are a place for the senior agency reps to make a case for or against decisions like this. |

| 11. Question 2.2: are the current objectives and content the CEOS Work Plan adequate for managing the CEOS annual strategic activities ? If not, which improvements would be necessary ? | |
|---|---|
| Respondent 1 | |
| Respondent 2 | My only comment, without looking in detail (on this aeroplane) at the docs would be rather passive. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Not enough aware of current status. |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | The CEOS Work Plan is meaningful by identifying the yearly CEOS WBS and the WBS is also checked and discussed at every monthly SEC telecon meeting. The Work Plan should therefore be defined and distributed by CEOS Chair Team as soon as in the beginning of the year. The live update should be discussed in the SEC telecon but we should avoid the long discussion in the beginning of the year. |
| Respondent 10 | the activities listed in the Work Plan as strategic ones are not always associated with the right actions to bring them forward. For instance, Biodiversity was mentioned as a top priority for GEO but in practice very little happen (only a POC was designated). The last WP mentions also the communication with G8 / G20 but no further actions had been undertaken. The Work Plan might be OK but there is no systematic follow-on actions to produce the outcomes identified in the WP. The WP content shall be fully related to the list of CEOS activities (which might go beyond the scope of the current CEOS GEO actions) |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | I believe they are adequate, but I think there is too much focus, especially in Secretariat telecons/meetings on the |

| 11. <u>Question 2.2:</u> are the current objectives and content the CEOS Work Plan adequate for managing the CEOS annual strategic activities ? If not, which improvements would be necessary ? | |
|--|---|
| | PROCESS of the Work Plan at the expense of major repetition (same outline for every telecom) versus a major issues focused telcon/meeting. Why is it necessary to go through and have a short report on every subsection of the Work Plan every time the Secretariat meets? The Work Plan should be a guide, not the governing process. I believe it is incumbent on the CEOS Chair Agency, as leader of the Secretariat (the CEOS Chair at the Plenary, and the SIT Chair at SIT) to dynamically lead the meeting to focus on key issues and outcomes, and not merely to touch every single base in the Work Plan. |
| Respondent 14 | Yes |
| Respondent 15 | CEOS needs a work plan and an implementation plan. Currently, there are no full-time resources to carry out the actions outlined in the work plan. That is why CEOS needs a full-time secretariat. |
| Respondent 16 | The plan needs to be multi year and to have input from the Troika. That way an incoming chair or SIT Chair is clear on his brief and goals for the coming Chair period. We should consider whether the running Work Plan should be an annex to the Overall Implementation Plan which is more of a running check of our commitments and activities and status. Clarity and simplicity in documentation is a must. The IP at present is a bit messy – im probably partly to blame having done the first edition..! |

| 12. <u>Question 2.2bis:</u> are the current objectives and content of the CEOS Implementation Plan adequate for managing the CEOS annual activities? If not, which improvements would be necessary? | |
|--|---|
| Respondent 1 | |
| Respondent 2 | As above, although it probably should not be. |

| 12. <u>Question 2.2bis</u>: are the current objectives and content of the CEOS Implementation Plan adequate for managing the CEOS annual activities? If not, which improvements would be necessary? | |
|--|---|
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Same as above. (i.e. "Not enough aware of current status.") |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | The CEOS Implementation Plan is the essential document of CEOS contributions to GEO, and it is important for identifying our contributions in the consolidated list and making the list available among CEOS agencies. Currently, since the Action Tracking Tool has been used and worked well in realizing the above IP functions, it would be enough for CEO to summarize the short report instead of the current long pages of the IP. |
| Respondent 10 | The CEOS Implementation Plan is very focused on the GEO Work Plan. There might be some interest to go beyond GEO. For instance, the major actions conducted by the SEO, the VCs, the WGs, ... shall also be inserted in the CEOS IP even if not directly associated to a specific GEO task. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Again, the Implementation Plan is a resource and guide and needs to be flexible and adaptable to dealing with the key issues of the moment. |
| Respondent 14 | Yes |
| Respondent 15 | The CEOS Implementation Plan should consider not only the requests from GEO, but also those from UN agencies that would benefit from CEOS actions (such as UNFCCC, WMO, FAO). The main problem is not how to build the CEOS implementation plan, but how to carry it out. |

| | |
|--|--|
| 12. <u>Question 2.2bis</u>: are the current objectives and content of the CEOS Implementation Plan adequate for managing the CEOS annual activities? If not, which improvements would be necessary? | |
| Respondent 16 | SEE ABOVE |
| 13. <u>Question 2.3</u>: what should CEOS do to ensure a regular presence of its Members and Associates? | |
| Respondent 1 | |
| Respondent 2 | An initiative from the Chair/SIT Chair in a given year to contact and explain the scope of CEOS activities which undoubtedly deserve and merit support from agencies to an extent greater than in the past., emphasising this point and the increase in effectiveness of CEOS. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Highs and lows in senior participation have been experienced in the past. Return to high-level motivation and attendance has been dependent upon highly visible initiatives, sometimes starting from CEOS (e.g., IGOS), sometimes coming from outside CEOS (like GEO), which have triggered new interest and helped put CEOS again on the front burner. A renewal of the approach to GEO, for example, or some bright new scheme for Constellations etc. could help catalyse such a movement |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | We assume that no regular participation members would be some emerging countries (i.e. China, Russia). For those such members that have different accustom to the multilateral discussion and also have another strategies or interests, we need to know what their interests and merits on CEOS are. Probably, it would be better for them to start to participate the |

| 13. <u>Question 2.3</u>: what should CEOS do to ensure a regular presence of its Members and Associates? | |
|---|--|
| | practical activities of CEOS such as the Working Groups and Virtual Constellations. |
| Respondent 10 | maybe surveying the Members & Associates to determine whether they have some specific expectations or interests from CEOS for the year to come or for a longer term period. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Having well-led dynamic meetings that provide opportunities for meaningful cooperation and effectively implement and track outcomes is the key. IGOS Themes, during the late 1990s, and now Virtual Constellations provide opportunities for involvement of space agencies. CEOS leadership should also dynamically and creatively seek to involve those CEOS Agencies that are not participating. WGISS and WGCALVal, and hopefully WGClimate seem to be attracting a number of agencies, and hopefully a reconstituted WGEdu will do so as well. |
| Respondent 14 | By better distinguishing the objectives of the different meetings and by reducing the number of meetings involving the same people. May be one SIT meeting per year (in June) is enough while having separate dedicated meetings on specific subjects not necessarily requiring CEOS principles attendance. |
| Respondent 15 | <p>CEOS can and should become stronger. CEOS has gone through a major transition in the last 10 years, since the Beijing Plenary:</p> <ul style="list-style-type: none"> (a) CEOS has assumed a leading role in GEOSS and GEO; (b) CEOS has provided key support for climate activities and has been recognized as relevant by the UNFCCC; (c) CEOS has launched the Virtual Constellations activities, a breakthrough that has outlined the importance of international cooperation in EO; (d) Many CEOS agencies are now engaged in promoting open access to EO data; (e) CEOS has launched important initiatives in Forest Carbon Tracking and Climate. <p>cEOS is now a relevant player in international cooperation in space matters. Emerging space nations to have now strong participation in CEOS. As CEOS becomes stronger, it will attract more members. There is no need for CEOS to set up</p> |

| | |
|--|---|
| 13. <u>Question 2.3:</u> what should CEOS do to ensure a regular presence of its Members and Associates? | |
| | procedures for attracting new members. However, there should be a procedure for suspending members that have failed to be present at two subsequent Plenaries. These members should be advised that their status as full CEOS members has been suspended until they formally apply for re-membership and attend the next Plenary. |
| Respondent 16 | Appealing agendas of policy relevance. You cant do more in the long term. |
| 14. <u>Question 2.4:</u> to ensure a proper functioning of CEOS, which meetings should be held, for which purpose and when ? What should be the attendance? | |
| Respondent 1 | |
| Respondent 2 | Broadly speaking I think we have evolved to a position where this is about right. We might improve if the SIT were really more focussed on implementation and the Plenary on strategy; this might lead to a necessity for only one senior technical SIT in spring and a Principals-led Plenary in fall. The addition al technical may become unnecessary if the follow up is adequate and the WGs, VCs are fully effective. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | In the last SIT meeting I attended, there was a trend to both more people and less high-level people. This was opposite to the very idea of the SIT. The new scheme may be an attempt to get back to the definition, but meetings are like vacuum: they seem to attract people (and distract senior level) and I am afraid that the situation degrades again. SIT invitations should be sent to a “shortlist”, they should appear as “closed meetings” if they are to be efficient. |
| Respondent 6 | |
| Respondent 7 | One SIT and one Plenary are enough. More will reduce the level of the representatives at the meetings. The Technical meeting is certainly interesting to a lot of people, but care should be taken to ensure that it does not try to second guess SIT |

| 14. <u>Question 2.4:</u> to ensure a proper functioning of CEOS, which meetings should be held, for which purpose and when ? What should be the attendance? | |
|--|---|
| | or the Plenary. Plenary attendance should be strictly observed. For SIT there has always been a difficulty in defining who has the right to attend. Too much discipline will discourage contributions. (There is a constant danger in trying to transform CEOS into a formal organisation with a fat rule book and endless discussions on commas and semi-colons) |
| Respondent 8 | |
| Respondent 9 | In terms of the SIT meeting, there has not been any issues on one per year meeting since last year. SIT Workshop has well covered for preparing the CEOS and GEO Plenary. SIT team requested to hold a SIT session in CEOS Plenary in coming November in Lucca. By getting the cooperation from the CEOS Chair for having such session, it would be possible to coordinate the task that needs SIT discussion or approval after “the one SIT meeting”. It would provide a more effective and converge way for reducing the meetings. |
| Respondent 10 | the current meetings dates, purposes and attendance are OK. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | <p>SIT has been and should continue to be the locomotive of CEOS----still at Principal level (this is important to emphasize) that oversees development of key CEOS cooperative activities, providing necessary feedback, and providing preliminary approval (as with IGOS Themes and now proposed Constellations) before these activities are served up to the CEOS Plenary for final, binding approval. I believe that having SIT meet at Principal (or deputized) level twice a year is essential if CEOS expects to maintain its effectiveness and step up to key activities. The SIT workshop approach, tried in Darmstadt, Montreal and upcoming this September in Washington, DC, still requires the involvement of the SIT Chair and is less effective if key individuals with decision-making authority for their agencies are not present.</p> <p>Plenary meetings must be scheduled well in advance and for sure need to take place a few weeks prior to GEO Plenary and UNFCCC COP.</p> <p>A major concern I have which I will mention here (and it is also relevant to other parts of this questionnaire) is that CEOS</p> |

| | |
|---|---|
| <p>14. <u>Question 2.4:</u> to ensure a proper functioning of CEOS, which meetings should be held, for which purpose and when ? What should be the attendance?</p> | <p>has been handling preparations for key November/December Plenaries/environmental Conventions on a somewhat ad hoc basis, largely under the leadership of that year's Chair, generally though not always in coordination with the Plenary, Secretariat, CEO. Most often in the last few years a series of ad hoc coordination telecons have been set up to handle preparations. They have been generally effective in collecting representatives, materials, etc. but I submit that this is a key priority that needs to be factored into the responsibilities of the key CEOS entities involved under the direction of that year's CEOS Chair (though the re is the problem I have mentioned elsewhere that this Chair is rotating out exactly at the time CEOS has to step up to major involvements). This issue should be discussed further.</p> |
| <p>Respondent 14</p> | <p>CEOS Principals at Plenary, SIT and technical meetings at working level. The CEOS activities contributing to GEO could concentrate on activities carried out in WGs, VCs with one SBA "point of contact". The role of this POC would be simply to act as an information relay making sure that GEO has a contact on the SBA in CEOS and that CEOS can promote the work of the WGs relating to each SBA in the appropriate GEO groups.</p> |
| <p>Respondent 15</p> | <p>As stated above, the concept of a SIT should be abolished and replaced by a schedule of two Technical Meetings. To repeat from 1.2 above, April-May: 1st CEOS Technical Meeting, co-located with WGISS and WGEdu, and part of the virtual constellations meetings. August-September : 2nd CEOS Technical Meeting, co-located with WGCV and WGClimat, and part of the virtual constellations meetings. November: CEOS Plenary, where the results would be presented and the plan for the next year be approved.</p> |
| <p>Respondent 16</p> | <p>1 SIT and 1 CEOS Plenary is sufficient if working staff are doing their job during the year. The workshop frankly seems to be another meeting by stealth and could probably be replaced by electronic and phone communication. CEOS has moved away from its previous travel club reputation and im concerned we are heading back there. More work and less meetings would achieve more.</p> |

| 15. <u>Question 2.5:</u> do you think the current level of communication is adequate? | |
|--|--|
| Respondent 1 | |
| Respondent 2 | Agencies are loathe to devote greater effort to this and given this fact the output is currently rather good. I would not see this as a high priority for revolution. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | From my limited window at COSPAR (an organization with 8,000 Associates, i.e. individual scientists affiliated with one or another Scientific Commission, the Commission on Earth Sciences being one of the largest) I must admit that I hardly receive enough “communication” from CEOS. |
| Respondent 6 | |
| Respondent 7 | I have always wondered why CEOS needs to boast about its achievements. For me, communication should be concentrated on getting the contributions we need to make our projects work. Of course, CEOS needs to be well represented in meetings of such organisations as GEO, but I’m against a lot of effort going into stalls at self-serving events. |
| Respondent 8 | |
| Respondent 9 | We recommend to continue the efforts as far as possible. |
| Respondent 10 | the CEOS communication is very often decided on a case by case basis with short notice. Better anticipation would be beneficial and more fruitful. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | More emphasis should probably be placed on the Website. The Newsletter is well done but perhaps should be distributed electronically. Special focus documents, the CEOS Handbook and updated CEOS brochures are particularly valuable for handing out at Ministerials, COP meetings, etc. as are one-pagers that provide a specific focus of relevant CEOS activities with respect to the particular GEO, UNFCCC, event, or perhaps for Rio 2012, etc. Having CEOS speakers at side events is also very important (either at events organized by CEOS or more likely at UNFCCC an event organized by a COP |

15. Question 2.5: do you think the current level of communication is adequate?

| | |
|----------------------|---|
| | Member or Observer to which CEOS has a direct link). The CEOS Annual Report that NASA stopped providing a few years ago was an important repository of Terms of Reference, listing of CEOS Members, CEOS Chairs and Plenary venues, etc. Such information is now missing or out of date and could be updated and put on the Website. |
| Respondent 14 | Concrete work done at working level may be not enough known : Publications in dedicated reviews should be more systematically considered. |
| Respondent 15 | CEOS faces the same problems as all media and international organizations: how to communicate globally in the age of the internet? Printed material are the medium of choice currently for CEOS. In internet times, printed materials should be restricted to documents that are expected to have a lifetime of more than one year. Thus, CEOS newsletters and other short-lived items should be only web-based. This brings the issue of the quality of the CEOS website. Improving the quality of the website is the most important task to improve CEOS communication. The website is currently a weak link in CEOS communication. Much important information on CEOS is not part of the website. For example, all Virtual Constellation portals are hosted outside the CEOS website, with different maintainers and update policies. A complete revision and update of the CEOS website is urgent. Ideally, a full-time CEOS secretariat (see above) would be in the best position to update the information of the CEOS website and to ensure it contains meaningful information to all interested visitors. |
| Respondent 16 | Probably. |

16. Question 2.5bis: should the organization of the CEOS communication be improved? If yes, how?

| | |
|---------------------|--|
| Respondent 1 | |
| Respondent 2 | Use current resources to target higher level meetings, more strategically. |

| 16. <u>Question 2.5bis</u>: should the organization of the CEOS communication be improved? If yes, how? | |
|--|--|
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | The CEO should receive a mandate to elaborate and propose a new Communication Plan to the Plenary (should be part of CEO's ToRs). |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | The high level profile publication summarizing the CEOS achievements in last year was really good for highlighting stakeholders. Also, CEOS News Letters should be important to sustain for adviterizing and recording our activities. The printed News letter has been an appealing handout at the high-level meetings like CEOS booth or GEO Plenary. So these publications have contributed to show up the CEOS outcome to our stakeholders. Such fundamental tools for the CEOS communication should be maintained and improved. |
| Respondent 10 | The annual Work Plan should include a detailed section on communication or a separate communication plan (short, 2 to 3 pages) should be issued well in advance of the 1 st major annual events. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | See previous response |
| Respondent 14 | |
| Respondent 15 | See above |
| Respondent 16 | No real comment. |

| 17. <u>Question 2.6:</u> is the current level of information adequate to ensure a proper sharing of information? | |
|---|--|
| Respondent 1 | |
| Respondent 2 | OK, while it can always be improved but should be driven by any changes in management. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Not in a position to comment on this. |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | Yes. The current information sharing is well working. It should be noted that e-mail and CEOS website work also good for the sharing information. |
| Respondent 10 | Yes |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | See ideas in my 2.5 response |
| Respondent 14 | Yes : mailing lists are well used. |
| Respondent 15 | Important documents are being distributed through the CEOS email list, which is adequate for immediate sharing of information. However, not all important documents are also shared through the CEOS website. The site should be organized to hold relevant documents. This would also allow smaller emails, without the need for big attachments. |
| Respondent 16 | Yes |

| 18. <u>Question 2.6bis</u>: should the sharing of information among CEOS members be improved? If yes, how? | |
|---|---|
| Respondent 1 | |
| Respondent 2 | See above |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Not in a position to comment on this. |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | / |
| Respondent 10 | it is not too bad. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | |
| Respondent 14 | Indicate in the email title : ;[INFORMATION] or [ACTION] or [COMMENTS] etc... |
| Respondent 15 | |
| Respondent 16 | |

| 19. <u>Question 2.7</u>: should CEOS connect more often to major political events like G8 or G20? | |
|--|--|
| Respondent 1 | |
| Respondent 2 | Unsure this will lead to major changes but worth pursuing. Better perhaps to target high level technical (e.g. GEO) meeting of relevant Ministers. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Yes, certainly. This is where CEOS comes from, and should report to, actually. |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | It is important for CEOS to be recognised at G8/G20. To realize such recognition CEOS members should make best effort to encourage their governments in order to put CEOS contributions into the summit statement. |
| Respondent 10 | yes as politicians and decision makers participating to those kinds of events , are not reachable if CEOS remains hidden behind GEO |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Yes, but only IF there is a specific connection that can be made. This has to be carefully worked far in advance with the Sherpas of the G8 or G20 with the result that CEOS receive and respond to a specific charge (as with the original G7 1982 efforts that led to the creation of CEOS). Otherwise, it is very important, as noted above, to have up-to-date material that can be shared if there is a short-fuse opportunity. |
| Respondent 14 | Yes probably. |
| Respondent 15 | Yes. CEOS should pursue actively all opportunity to connect to global events such as major summits (G8, G20, BRICS) |

| 19. <u>Question 2.7</u>: should CEOS connect more often to major political events like G8 or G20? | |
|--|---|
| | and important meetings of international conventions (UNFCCC, UN Convention on Biodiversity, UN Convention on Desertification). This needs both CEOS presence in such events and also CEOS deliverables. Thus, increasing CEOS global presence depends on ambitious action plans that are fulfilled. |
| Respondent 16 | If we have something relevant to say. We have always struggled to connect effectively and it takes a political champion like the UK Govt did in 1992 to elevate the space agency work to a higher level. Finding well connected space agency senior people seems to be the key to this (Dave Williams at the time). The disconnect between ESA (perhaps the most active CEOS agency) and the EC does not help the situation. We should perhaps also be asking whether we need to connect more to UNFCCC and IPCC – for example. GEO has apparently failed or neglected this domain. |

| 20. <u>Question 2.7bis</u>: what other political events should CEOS participate in ? | |
|---|---|
| Respondent 1 | |
| Respondent 2 | / |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | CEOS already takes part to COPs, and could participate in other international environmental conventions as well. Other important political fora include Rio+20, WMO and IOC Executive Councils and Congresses. Some large scientific conferences, e.g., AGU, COSPAR, the forthcoming PuP2012 (Planet under Pressure), could host some CEOS presence and deserve attention. The scientific community is not enough aware of CEOS activities and initiatives. |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |

| 20. <u>Question 2.7bis</u> : what other political events should CEOS participate in ? | |
|---|-----|
| Respondent 9 | / |
| Respondent 10 | / |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | |
| Respondent 14 | COP |
| Respondent 15 | |
| Respondent 16 | |

| 21. <u>Question 2.8</u> : are? | |
|--------------------------------|--|
| Respondent 1 | |
| Respondent 2 | The SBA role has to be seen in view of the partnership CEOS-GEO and the future of GEO. This is rather less certain than in the past. The SBA coordinators perhaps have too much expectation thrust upon them; they do not have sufficient authority to be able to deliver from members all that the group as a whole expects of them. If GEO had SBA coordinators with clear SBA plans and responsible bodies for each SBA then this role might be easier to fulfil. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Yes ☺ |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | |

21. Question 2.8: are?

| | |
|----------------------|--|
| Respondent 10 | Whoever is the CEO, he / she cannot be expert in all SBAs. At the origin, the SBA Coordinators were expected to “coordinate” the CEOS activities relative to a specific SBA as experts in their fields. In practice, only few SBA Coordinators have dedicated time to organize the relevant CEOS activities. When effective, the contributions from SBA Coordinators have been very useful. Maybe a new call for volunteers could be initiated again to give the chance to those interested to become SBA Coordinators. If only a subset of the SBAs find a Coordinator, this would be useful anyway for CEOS. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | |
| Respondent 14 | Link between contribution to GEO and work done at WGs, VCs of CEOS level should be stronger (see 2.4). |
| Respondent 15 | |
| Respondent 16 | |

22. Question 3.1: what are the most successful past achievement of CEOS ?

| | |
|---------------------|---|
| Respondent 1 | |
| Respondent 2 | Response to GCOS, response to GEO, VC structure, Climate WG, WGCV. Links to UNFCCC and role of space agencies there. Recognition as primary forum for outside agencies to address EO space agencies as a whole, and ability to deliver a coherent response to these. Increasing focus on working methods, objectives and tasks. Increasing relevance to outside world e.g. carbon modelling, science in general, environmental drivers. |

| 22. <u>Question 3.1</u>: what are the most successful past achievement of CEOS ? | |
|---|--|
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | There are many, stemming from the very existence of CEOS since over 25 years. The existence and work of the standing technical committees, a series of basic information documents and resources, the development of IGOS, and above all the culture of data exchange and the sense of international cooperation which materialised in the CEOS response to GCOS-IP, the CEOS-IP for the space-based component of GEO and (paradoxically) in the concept of “Virtual Constellations” . |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | There had been many agency cooperation since CEOS established. Also, sharing the information of various cooperation would have stimulated to CEOS members for more cooperation in future. The current situation itself would be a big achievement of CEOS. Also, some very practical and essential achievements of WGISS/IDN, CEOS Format, MIM, etc should be recognized as the significant CEOS assets. |
| Respondent 10 | among the most recent success to CEOS: organize itself to become the space arm of GEO and in particular to have undertaken a series of related activities like: <ul style="list-style-type: none"> - define a series of actions to support GCOS; - define the concept of Virtual Constellation; - support major activities like the Forest Carbon Tracking. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | <p>---Direct involvement by CEOS Chair, and recognition/direct mention of CEOS at 2005, 2007 and 2010 GEO Ministerials.</p> <p>---Charge given to CEOS to engage with GCOS by UNFCCC SBSTA</p> <p>---CEOS presentations at UNFCCC COP-related side events</p> <p>---Providing the key impetus for the development of the IGOS Partnership and individual IGOS Themes</p> |

| | |
|---|---|
| 22. <u>Question 3.1:</u> what are the most successful past achievement of CEOS ? | |
| | <p>---Providing the key impetus for the development of and provision of sustained support for GEO</p> <p>---Pioneering the way in Global Forest Carbon, Carbon Community of Practice and other broad external activities</p> <p>---Playing a key role in the activities of the WMO and its Space Programme</p> <p>Above cited achievements are all external; internal achievements, of which there are many, could include:</p> <p>---Development of CEOS Virtual Constellations (of course also related to GEO)</p> <p>---WGISS and CalVal development of what have become international standards</p> <p>---etc.</p> |
| Respondent 14 | VCs . |
| Respondent 15 | Launching of the virtual constellations initiative and the linking of CEOS as a major contribution to GEO . |
| Respondent 16 | <p>The working groups (esp WGISS and WGCV) have been very productive birthplaces for progress on standards etc of real value to the community and of systems like the IDN. The CEOS Handbook and Database are widely recognised as invaluable statements of plans and capabilities and the basis for the many and increasing analyses which power our coordination process.</p> <p>The Virtual Constellations are a powerful brand and vehicle for real coordination efforts.</p> <p>The CEOS Response to the GCOS IP has elevated CEOS into the climate domain in an important way and with linkages to the UNFCCC and SBSTA and GCOS. This is crucial and will remain so.</p> <p>CEOS has responded very well to the FCT activity and is poised to play a major role in the GEOI implementation – which is a major policy-relevant activity.</p> |
| 23. <u>Question 3.1bis:</u> what are some less successful past achievement of CEOS ? | |
| Respondent 1 | |

23. Question 3.1bis: what are some less successful past achievement of CEOS ?

| | |
|----------------------|---|
| Respondent 2 | Self-indulgent and introspective actions of WGs, reluctance of Plenary to take responsibility for or direct WGs, flaccid direction of VCs. SIT declining in role as foreseen of implementing body and less different from Plenary than should be. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | ? |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | Sometimes, international coordination body would be easy to fall in the risk of “meetings for meeting without any practicalities”. Although we assume CEOS is rather practical and healthy with other UNEntities, we should be very careful in order to keep organizing the healthy/practical meetings and activities. |
| Respondent 10 | from the experience built during the recent years, there is still room for improving the coherency of the various CEOS actions, decisions, .. such as: <ul style="list-style-type: none"> - refocus the scope of the Virtual Constellations to support the CEOS response to GCOS - the management of the GCOS actions handled differently from the other CEOS actions |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | ---Retention of a number of its Members and Associates who have become less active |
| Respondent 14 | To not have been involved in the creation of the International Charter – the best CEOS achievement outside CEOS! |
| Respondent 15 | Failure to act together on important issues such as open access to medium-resolution EO data. |

| 23. <u>Question 3.1bis</u>: what are some less successful past achievement of CEOS ? | |
|---|--|
| Respondent 16 | Some IGOS Theme reports were more successful than others in building communities and their transition to GEO. The role of the SBA coordinators as a tool for progress and management would appear to be in question. |
| 24. <u>Question 3.2</u>: do you think the current CEOS coordination, aiming at removing unnecessary overlaps and filling gaps in response to users' needs, adequate? | |
| Respondent 1 | |
| Respondent 2 | Probably only in the sense of being too ambitious. We will soon start to fail under the weight of our potential in many areas all of which cannot be covered. We need some way of saying No. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Oh yes! In fact it should even be strengthened. |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | Generally, the Space Agency resources are limited against the user needs. It is getting more important of international cooperation and so as CEOS role. CEOS should focus on Gaps of observation. (Overlaps would not be an issue at this point) |
| Respondent 10 | it could be better in theory but it is rather acceptable given the fact that CEOS Agencies contribute on a voluntary basis. Anyway we should not forget that those CEOS coordination activities are complemented by multi-lateral agreements between space agencies. |

| 24. <u>Question 3.2</u>: do you think the current CEOS coordination, aiming at removing unnecessary overlaps and filling gaps in response to users' needs, adequate? | |
|---|---|
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | More needs to be done to connect to the end users. CEOS in 2003 under John Townshend did a utilization study with little subsequent followup on this issue. Mary Kicza and Michael Rast (then GEO Secretariat) conceived the idea of "threads" which proposed to focus on end users, but SIT balked at taking this on. |
| Respondent 14 | This objective is essential while recognising that it is a kind of Graal... Virtual constellations groups should work with this objective in mind. |
| Respondent 15 | No. The growth of the importance of CEOS is reflected on the increase in size and complexity of the CEOS Work Plan. The current coordination (CEOS + SIT Chair, CEO + SEO) can no longer cope with the demand for CEOS. As outlined above, CEOS needs a full-time Secretariat. |
| Respondent 16 | It needs to get more specific. It can do this through a refocused virtual constellations process and driven by requirements from the likes of WGClimate, GCOS, GOOS, GEO and others. The CEOS database will remain essential for this and the work of the SEO – we appear to be on the brink of stepping up a gear in the potential to apply these resources effectively. |

| 25. <u>Question 3.3</u>: do you think that CEOS activities translate into benefits for its Members? | |
|--|--|
| Respondent 1 | |
| Respondent 2 | This is crucial for an agency like ESA to be able to demonstrate that its programs are coherent with others, not duplicated, cost-effective and relevant. I believe this has helped considerably garner support for ESA programs in the recent past. |

| 25. <u>Question 3.3</u>: do you think that CEOS activities translate into benefits for its Members? | |
|--|--|
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Not in a position to answer this question (but my opinion is YES!!!) |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | Yes. Each agency are participating to the CEOS activities such as WG, VC and so on based on their interests and benefits. |
| Respondent 10 | there are many examples of activities that could not be supported by a single agency. Thanks to cooperation within CEOS, some of these activities can progress. One of the best examples is the Forest Carbon Tracking. Without the CEOS collective support this activity could not live. The result is beneficial to all participating agencies. Another example are the cal / val activities that are a must for the characterization of the instruments of each Agency. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | I believe that committed Members (versus those who have become less active) reap benefits. Certainly a lot of bilateral and multilateral cooperation has been spawned through contact either in the CEOS meetings themselves or as a result of bilateral side discussions at CEOS meetings, e.g. Jason, with four partners signing a Letter of Intent for follow-on Jason at the 2001 CEOS Plenary in Kyoto. |
| Respondent 14 | A better exchange of information and coordination are fundamental benefits for the members. This cannot be done by bilateral exchanges only. |
| Respondent 15 | A very qualified Yes! CEOS activities are important and relevant for its members, especially those from emerging space agencies. By focusing on gap filling and pointing out major opportunities for international cooperation, CEOS is a very relevant forum for space agencies. In the case of Brazil, it has enabled INPE to interact with the leading space agencies and |

| | |
|---|--|
| 25. <u>Question 3.3</u>: do you think that CEOS activities translate into benefits for its Members? | |
| | to benefit immensely from the connections established during CEOS meetings. |
| Respondent 16 | There is no question that the future of EO data supply by governments lies in a coordinated approach – as operational meteorology has shown. Climate data records will be equally a multi-lateral affair. And GFOI and others. CEOS can offer international leverage for continued funding or new funding of given missions in support of recognised common objectives – as expressed say by the Virtual Constellations or WGClimat. |
| 26. <u>Question 3.4</u>: in addition to GEO, should CEOS consider other major global initiatives promoted by other instances like the G8, G20, etc .. when defining its goals and objectives ? What other initiatives do you consider relevant for CEOS? | |
| Respondent 1 | |
| Respondent 2 | I would not advocate this – we have too many good, technical partners already to be able to satisfy inevitably rather vague ambitions of such groups. But we need to take into account other technical areas such as science programmes (WCRP, IGBP...) major public sector users |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Supposedly GEO should encompass all Earth observation activities pertaining to the so-called nine SBA's. These SBAs cover rather extensively the civilian needs for Earth observation. Moreover G8 or G20 countries are all members of GEO. I cannot think of any major global civilian initiatives outside the GEO SBAs, but this is simply a sign of my lack of imagination... |
| Respondent 6 | |
| Respondent 7 | The answer is clearly YES, but the main message should be that CEOS members have limited resources and that we seek advice from the organisations as to how best they can be used. But never forgetting that GEO is the main game in town – |

| | |
|--|--|
| 26. <u>Question 3.4:</u> in addition to GEO, should CEOS consider other major global initiatives promoted by other instances like the G8, G20, etc.. when defining its goals and objectives ? What other initiatives do you consider relevant for CEOS? | |
| | even though it is not the best international organisation we have seen. |
| Respondent 8 | |
| Respondent 9 | No matter with no GEO , CEOS has its own identity. However, at present, CEOS priority in next 5 years should be to contribute GEOSS 10 year IP. At the same time, CEOS needs to contribute and has being contributed to other requirements such as UNFCCC/GCOS. |
| Respondent 10 | CEOS should keep an eye on other major global initiatives even if for the time being the majority of CEOS actions are related to GEO. There might be major initiatives in the future that are executed or at least started outside the scope of GEO |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Yes, CEOS should be willing to consider other major global initiatives within its abilities to take on new commitments. The G20 would seem to be potentially very important. |
| Respondent 14 | GEO remains the major programme on Earth Observation and as such CEOS has a major contribution to make on the satellite based data. The other initiatives cited are not of the same nature and can provide little more than a shop window and welcome publicity. |
| Respondent 15 | CEOS should support GEO, but should not be limited to it. CEOS can and should respond to other international organizations, such WMO, FAO, UNFCCC, UNEP, UN Convention on Desertification. CEOS has a well-defined set of stakeholders (the space agencies) that need an international forum for meeting and discussing their common interests and challenges. In theory, CEOS and GEO share so many common goals that merging them would make sense. In practice, GEO has not yet achieved a stable status as an international organization. There are unresolved tensions between GEO and UN organizations (some would claim these tensions are permanent). Even if GEO gains a stable status after 2015, the question remains as to why leading space agencies should abolish a forum where they are the leaders and stakeholders in favour of working only inside GEO, where space agencies are not the decision-makers. Thus, if CEOS does not want to be |

| | |
|--|---|
| 26. <u>Question 3.4:</u> in addition to GEO, should CEOS consider other major global initiatives promoted by other instances like the G8, G20, etc.. when defining its goals and objectives ? What other initiatives do you consider relevant for CEOS? | |
| | formally merged with GEO, it needs to support other international organizations to maintain its independence. In short, CEOS needs to become more than “the space arm of GEO”. Ideally, it should be “the space arm of the UN system” or better yet, “the place where international cooperation in Earth Observation happens”. CEOS needs to persuade WMO that it can replace CGMS and to induce IOC, GCOS, GTOS, UNFCCC and other global players that it can respond effectively to their space coordination requests. |
| Respondent 16 | CEOS funding is predicated on being policy-relevant to its funding governments –so yes. Especially in light of the delicate situation regarding GEO – whose long term health appears far from guaranteed. CEOS should not tie itself to the mast of the GEO ship alone |
| 27. <u>Question 3.5:</u> in addition to the short /midterm goals and objectives defined annually, would CEOS need to define some strategic goals and objectives covering the next 5 years (for instance 5-year strategic plan revised annually)? | |
| Respondent 1 | |
| Respondent 2 | A rolling 5 and (less specific) 10 year plan and set of objectives would be useful, with an implementation plan reviewed annually with evolutionary changes. They should all be clearly related to each other. |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Thinking of the longer term CEOS should try and elaborate its own role in the post-GEO (10-year) era. I think that CEOS should be proactive in defining its participation in the future of GEOSS beyond 2015. |
| Respondent 6 | |
| Respondent 7 | A 5 year strategic plan would be good – but it shouldn’t take effort away from the on-going work. |

| | |
|---|--|
| 27. <u>Question 3.5:</u> in addition to the short /midterm goals and objectives defined annually, would CEOS need to define some strategic goals and objectives covering the next 5 years (for instance 5-year strategic plan revised annually)? | |
| Respondent 8 | |
| Respondent 9 | CEOS has been contributing to develop a space part of GEOSS since GEO begun and CEOS will contribute the GEOSS 10YIP until 2015. Also, CEOS is supporting the GCOS Implementation Plan. CEOS has now enough mandate to provide support to high level requirements in the next 5years. |
| Respondent 10 | yes, a 5-year plan revised annually is absolutely needed to fix the long-term objectives and to agree on common activities in the long-term. |
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | Yes, a 5-year strategic plan would seem to be a worthwhile effort---it should be flexible and should be reviewed and revised annually. |
| Respondent 14 | SIT and plenary should be operating with a five year horizon provided by the CEO/SEO. Day-to-day operation should be covered by the WGs. |
| Respondent 15 | CEOS needs to do a better job in the Virtual Constellations initiative, which to my view is a key action for judging its effectiveness. In theory, the VC initiative has everything going for it: identify relevant Earth observation types, perform gap analysis, provide common requirements, promote cross-calibration and open access to data. In practice, there have been some limiting factors. The financial crisis and its consequence on the budgets of major space agencies is a limiting factor. Another problem is the lack of effective participation of China and India in the VC initiative. A third issue is limited progress on the cal/val side. While the first problem is outside the control of CEOS agencies, the second and third issues should be addressed. CEOS should also actively approach the UN agencies (WMO, FAO, UNFCCC and other conventions) to better understand their needs and to improve CEOS relations with the UN system. |
| Respondent 16 | See above. I think 3 years is more realistic. People say whatever they like in a 5 year plan. |

| 28. <u>Question 3.6:</u> in which major activities and initiatives should CEOS be involved in the next 3-5 years? In the next 10 years? | |
|--|--|
| Respondent 1 | |
| Respondent 2 | Wow. REDD for sure and the GFOI plan needs to be good enough to ensure adequate participation from CEOS agencies. IPCC links might be better managed, perhaps via WCRP which is not very active although willing to do more I think. I will not hold my breath but the EC could become a much more effective partner in serving GMES. Environmental needs in Europe better through CEOS |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | Revision of the CEOS response to the updated GCOS-IP, actual implementation of the Virtual Constellations and consideration of new VCs, pursuance of the WGCV activities in coordination with GSICS and other related initiatives, and of WGISS activities related to long-term data archiving, distribution and production of generic/tailored products and services in coordination with similar initiatives – well, that's enough to make a lot of people busy for some time! |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | In considering the 5 years term, CEOS support to GCI in the main part of GEOS development success would be important. Long term observation and data provision for such as the GCOS/ECV would be an another CEOS significant topic. Current situation of the mixture of R&D and Operational agencies but dominant R&D in CEOS would be a challenging topic. |
| Respondent 10 | at least GEO including all climate change related activities |

| 28. <u>Question 3.6:</u> in which major activities and initiatives should CEOS be involved in the next few years? In the next 3-5 years? In the next 10 years? | |
|---|--|
| Respondent 11 | |
| Respondent 12 | |
| Respondent 13 | CEOS particularly needs to carefully track and be prepared to help focus the development of GEO and where GEO is going at the conclusion of its initial 10-year Implementation Plan. In the climate area, GEO needs to be attuned to Global Framework Climate Services and climate architecture issues, working together with WMO and other organizations but as an independent partner representing the space EO community. |
| Respondent 14 | <p>The creation of the data web : interoperability between databases containing geospatial data. Guaranteeing the quality and inter-comparability of earth observation data generated by CEOS agency satellites. Effective implementation of the current VCs. New initiatives (for instance Virtual Constellations) should be selected in accordance with the GEO priorities and Work Plan.</p> |
| Respondent 15 | <p>CEOS is the house of the space agencies, and should remain so. Space agencies worldwide face the effects of the financial crisis. Indeed, given their high profile and significant budget, space agencies will always be questioned by governments and society, who want to see tangible returns on public investment. In the next 5 years, CEOS should aim to do a better job in promoting the use of Earth Observation data by scientists and society. Some possible initiatives are:</p> <ul style="list-style-type: none"> (a) Identify best practices in the use of EO data and promote them. (b) Improve the current CAL/VAL and WGISS initiatives to make EO data truly interoperable. (c) Promote Data Democracy, by making open access to EO data part of the CEOS aims and identifying actions that could make EO reach a large audience. (d) Improve the Virtual Constellations initiative, by focusing on VCs that have active international partnerships. <p>Create a CEOS Secretariat, whose main task is to improve CEOS interfaces to international agencies.</p> |
| Respondent 16 | Climate. Forest Carbon. |

| | |
|--|--|
| <p>28. <u>Question 3.6:</u> in which major activities and initiatives should CEOS be involved in the next few years? In the next 3-5 years? In the next 10 years?</p> | <p>Global Carbon Observing System (Carbon task Force) Geohazards (supersites) Agriculture will be important but fraught with political and commercial sensitivities – I suggest a high level assessment of whether JECAM is something to support or not is needed – we should not be naïve. We should develop better relations with IPCC, UNFCCC and other key conventions where relevant (Rio+20 included). Virtual Constellations should be refocused and linked to analyses of CEOS MIM and WGClimat and others to define 3-year outcomes with specific coordination goals.</p> |
|--|--|

CEOS Self Study
Study Team on Working Groups and Societal Benefit Areas
Report to CEOS Self Study Steering Committee
Final Report, Version 1.0
October 1, 2011

1. Introduction

In preparation for NASA taking on the role of the CEOS SIT Chair in November 2011, Dr. Michael Freilich proposed that CEOS embark on a self study to examine its accomplishments and lessons learned during its first 25 years of existence. The intention of a close examination of this kind is to benefit CEOS going forward and help NASA to effectively lead CEOS activities that are succeeding, address challenges, and guide new initiatives. Most importantly, focusing on CEOS' achievements, lessons learned, and challenges, should lay the foundation for CEOS to support and facilitate the highest levels of effectiveness and efficiency in the coming years.

The Self Study will consist of two main components – the three Study Teams, and a Steering Committee that will guide and coordinate the development of the final report. This Preliminary Report of the Study Team on Working Groups and Societal Benefit Areas was composed in its entirety by the Study Team Lead for submission to the Steering Committee to aid early analysis of the overall Steering Committee Report. A Final Report of this Study Team that will be more complete and will have the advantage of review by the Study Team will be provided to the Steering Committee in several weeks time.

2. Executive Summary

The CEOS WGCV and WGISS (nee Working Group on Data) are the oldest functional groups in CEOS, dating from the 1980s. Over the decades, these groups have provided outstanding achievements that resulted in harmonized products in consistency of content and presentation of data and products to the international user community. With technology advances, new generations of instruments, calibration and validation capabilities, system and information technologies have provided new generational means of more advanced harmonization. Currently, a global Earth Observation “system of systems”, where a user anywhere in the world could get products from all Earth Observation satellites consistently calibrated and validated, and provided through the portal of choice in any format requested is technologically achievable. The challenge that remains for CEOS are the harmonization of direction, priority and policy, and the application of needed resources that could forge the way.

The newer infrastructure within CEOS, including WGClimate, WGCBDD, CEO, DCEO, SEO, VCs, and SBA Coordinators provides challenges in internal lateral coordination, but also good opportunities for concerted efforts towards substantive contributions in Earth Observations. Members of all groups have informally sought out and are increasingly achieving basic connections in the arenas appropriate for expertise to be brought to bear. There are emerging projects populated by teams from various quarters of CEOS, and more integrated and useful products are resulting from these cross-fertilizations.

3. Overall Preliminary Findings and Recommendations

Finding: CEOS could be more customer-driven with a better strategic focus to work on priority, substantive activities.

- GEO poses a genuine demand on CEOS to be its satellite arm, yet GEO can quickly overwhelm with lists of tasks.

- CEOS SIT used to be a forum for CEOS to meet with multiple international scientific organizations as customers, but all, including GCOS, have moved into GEO. IGOS in previous years acted to become a sort of prism for focusing the myriad requirements, sometimes duplicative, overlapping or quite similar in nature, for the Earth Observations community of CEOS. The WGs and SBAs have focused their efforts to provide priority, substantive products to provide the satellite arm of CEOS in this new organization.

- Best efforts, voluntary basis of CEOS not conducive to concerted efforts. The WGs and SBAs, while turning to a new, complex, and immature organizational structure as customer focus, must also find areas where enough interest from each agency is present in order to make progress on a selected activity. Presentation of proposed activities by WGs and SBAs must be made both internally to the agency of the WG or SBA member, and also by the WG Chairs and SBA Coordinators to CEOS Representatives and staff at Plenary and SIT meetings.

Input from WG Chairs currently, and consistent with the recent past, is that at the WG level there is not much support from many CEOS Principals. For example, the number of agency representatives attending the WGISS recently is only 8-10. Out of about 45 CEOS member agencies, this is only about one fifth. And, among those attending maybe only 6-8 agencies are very active. And among those active, perhaps only half are acknowledged and consciously supported by their CEOS Plenary/SIT representatives. It is also remarkable that WGISS and WGCV are having trouble getting offers from CEOS members for incoming Vice Chairs.

- Working Groups and SBAs want to be empowered. CEOS Plenary and SIT meetings and processes are not optimally configured to provide strategic prioritization and feedback to WGs and SBAs that are requested. Other methods of reporting and providing written correspondence, plans and reports to Plenary and SIT have often resulted in inaction.

4. Working Group Self Study Preliminary Findings and Recommendations

WGISS (as evolved from Working Group on Data through various information technology generations) and WGCV have been Working Groups in CEOS since the 1980s. They were mandated via Terms of Reference to use their WG makeup of scientific, satellite instrument data analysis, computer science and information technology expertise to coordinate research and development in response to collective

user needs of the CEOS agencies' users around the world. For example, users of satellite data would like to be able to get data without going to multiple agency data sites to retrieve the data, and would like to be able to analyze the data together. Users don't want gaps in data availability. Harmonization on the provider side just makes sense.

As indicated in the CEOS Self Study interview with one of the authors of the original CEOS Terms of Reference, the original objective of CEOS was to make life easier for users. That respondent used the example of the then-operating Landsat and SPOT, and said CEOS was attempting to make sure that, as an outcome of the providers' collaboration and harmonization of the data format and downlink, all necessary parameters were compatible, i.e. a user could get a tape from either provider with data that would be compatible. The respondent mentioned some of the various harmonizations needed at that time: that the data flow had headers that contained everything needed to read tapes, and that time was spent on coordinating metadata, calibration, and validation methodologies. Those same user needs are heard 25 years later.

Finding: WGISS and WGCV have changed from bottoms-up R&D arrangements to contributing to CEOS satellite arm of GEOSS; however, integrally contributing activities are still formulated largely by the WGs with much autonomy. WGs respond to Tasks and Actions assigned from SIT/CEO.

WGCV and WGISS have a history of parallel meetings with joint sessions, targeted at mutual products or exploration for cooperation on topics of mutual interests with complementary expertise, and of ongoing coordination over many years.

As organization of CEOS has grown in response to the Rio Statement, WGs have reached out to VCs and SBAs where perceived value can be added. The newer infrastructural groups have reached out as well.

In addition, the perceived "satellite arm of GEOSS" cannot be understood as if the CEOS organization has one customer in GEO. Work in response to this declaration comes in the form of GEO Tasks and Actions as provided by the SIT/CEO in a January-February timeframe meeting, GEO Secretariat members attending WG meetings with requests, multiple GEO Committees and Tasks led by GEO Members and Associates, and international organizations such as IGOS (which remains a vital customer of CEOS).

Therefore the coordination, including the need for exchange of expertise, requirement of outputs, has been managed by WGs' in multiple successful ways:

- Providing and inviting POCs to attend meetings, assist in planning of agendas, giving presentations, and agreeing to joint activities and products.
- Reviewing products of other bodies.
- Collaborating projects across space agencies.

The WGISS has responded to the LSI and ACC VCs to set up portals, with requirements coming from the users of those discipline data, as represented in the LSI and ACC teams.

Water SBA Coordinator and the WGISS have been collaborating on specific data needs since GEWEX's Coordinated Energy and Water Cycle Observations Project (CEOP), and recently met with the PC and their data system personnel. The PC data system has provided precipitation in near-real-time to the WGISS-sponsored sensor-web based projects on flood response involving the Disaster SBA Team.

A point in fact is that WGCV Subgroups have many common support roles for the virtual constellations. Waco's Atmospheric Composition Subgroup (ACSG) supports and has common players in the ACC. The LSI constellation has common needs for cal/val support from the Synthetic Aperture Radar Subgroup (SAR), Infrared and Visible Optical Sensors Subgroup (IVOS), the Terrain Mapping Subgroup (TMSG), and the Land Product Validation Subgroup (LPV).

Even though Working Group on Climate is new, all WGCV subgroups will have some common work areas with this working group. The Ocean Constellations - SST, OSWV, OCR, OST - have relationships to WGCV's Microwave Sensor Subgroup (MSSG), SAR, IVOS subgroups. The PC is also tied into WGCV subgroups such as MSSG and LPV.

The Systems Engineering Office (SEO) has supported WGISS, WGCV, the constellations, and the SBAs across the board. The SEO-supported Website is quite helpful, both as external information to the world, and internally to CEOS. For example, the Systems Database is designed to support CEOS strategic planning and gap assessments.

The new WGClimate has organized itself in this new larger CEOS environment from the start. Figure 1 is taken from the WGClimate report provided by Mark Dowell at the September 2011 SIT-27 meeting recently.

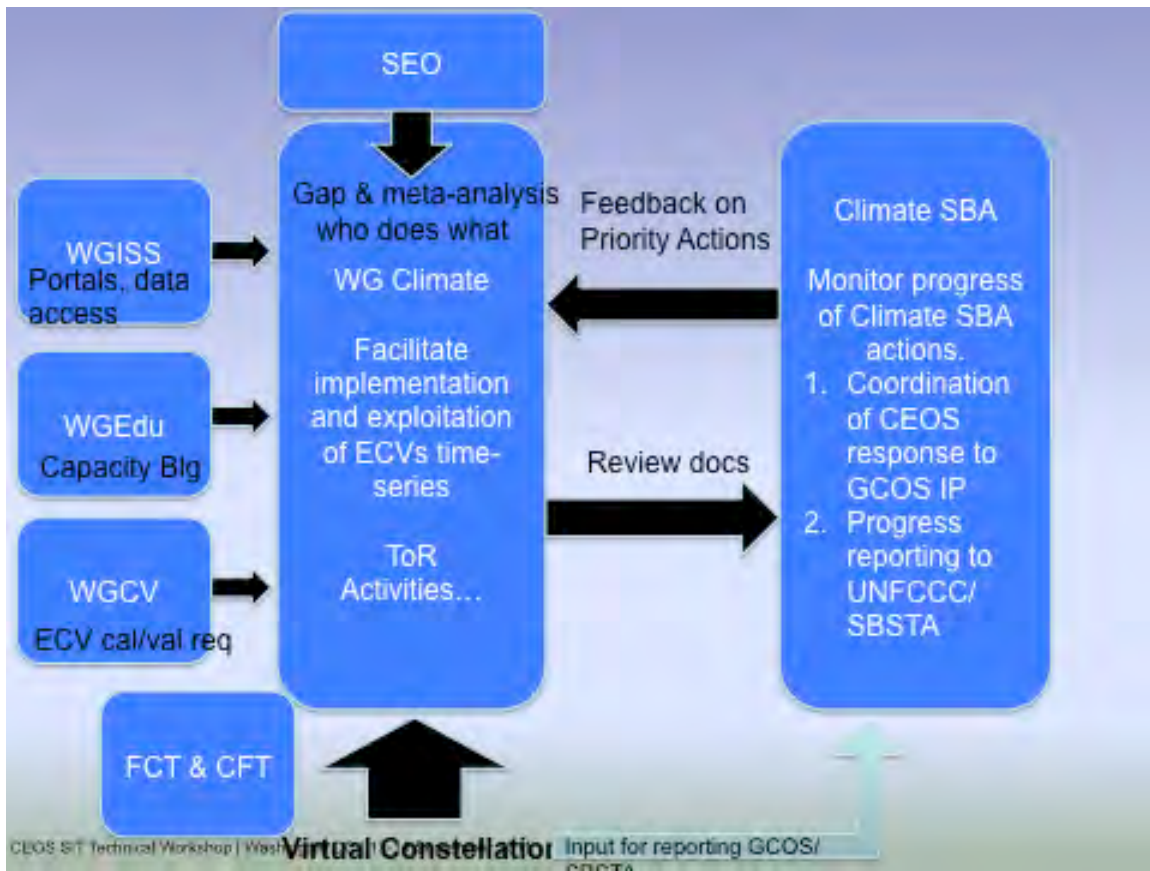


Figure 1. From PPT Presentation “Report on Initial Progress of the CEOS Working Group on Climate

Note that the arrows between WGClimate and the SEO, WGISS, WGEdu, WGCv, and the VCs all flow only one way, whereas likely two-way interaction arrows are more descriptive now or will ensue. Only the Climate SBA is now indicated on the slide.

Finding: WGs lateral internal (other WGs, SBAs, VCs) and external coordination (GEO multiple Committees and Tasks, IGOS, etc.) has grown.

In addition, WGCv and WGISS planning processes include the development of 5 Year Work Plans, updated for currency periodically. When they are updated, they are provided to the CEOS Plenary, and published on their pages of the CEOS Website.

Exemplary products of WGISS (for more information, see CEOS WGISS Website):

- CEOS IDN
- WGISS Best Practices
- Archive Task Team Documents
- Interoperable Catalogue System Historical Documents
- CWIC
- WADC produced WGISS Recommendations To GEO

CWIC deserves some Self Study report attention. CWIC is being developed within WGISS' Architect and Data Contributions Project (WADC), led by NOAA and NASA. The CEOS WGISS Website contains much information on WADC and documentation on CWIC, including the Initial Design document, WGISS Search Criteria, CWIC Data Partner information and Client Partner information, and more. The following paragraph is taken from the Initial Design document:

“For scientists who conduct multi-disciplinary research, there may be a need to search multiple catalogs in order to find the data they need. Such work is very time-consuming and tedious, especially when the catalogs may use different metadata models and catalog interface protocols. It would be desirable, therefore, for those catalogs to be integrated into a catalog federation, which will present a well-known and documented metadata model and interface protocol to users and hide the complexity and diversity of the affiliated catalogs behind the interface. With such a federation, users only need to work with the federated catalog through the public interface or API to find the data they need instead of working with various catalogs individually.”

A major milestone, not only for CWIC but for the GEO “System of Systems” concept becoming a reality, was achieved at WGISS-32. Three different clients, one developed by the EU JRC, one by CNES, and one by NASA, were demonstrated live to discover, using the CEOS IDEN, and then to search and order data from multiple CWIC data partner archives (NOAA, NASA, USGS, INPE). The elation in the room from this remarkable achievement was palpable.

An exemplary outcome of the Disaster SBA contains an exemplary product and arrangement by WGISS. Use of the WGISS Sensor Web Interest Group's Sensor Web Modeling Application lists the Caribbean Flood Modeling Sensor Web under its Milestones. The Grid Interest Group supports the Wide Area Grid Testbed for Flood Monitoring using Spaceborne SAR and Optical Data Project under its current projects. These activities are integral to and are utilized by the Disaster SBA Teams' Caribbean Satellite Disaster Pilot. WGISS members, attendees, and products are an integral part of a successful SBA Project. WGISS has formed a Global Disasters Interest Group and plans to continue to work closely with the Disaster SBA.

Similarly, WGCV has made very good progress in data quality assurance through these collaboration projects such as the Cal/Val portal, QA4EO, and the Dome C experiment. Some of these projects have very positive long-term impacts in the cal/val community. One objective of the QA4EO is to establish standards for the cal/val community, while pilot projects demonstrate the unique values of CEOS. Now more and more agencies use the Dome C for satellite instrument cal/val. For example, NOAA is currently getting ready to use the Dome C for the upcoming NPP cal/val.

Exemplary products of WGCV (for more information, see CEOS WGCV Website):

- QA4EO
- Cal/Val Portal and Post-Launch Test Sites
- DOME C Experiment

Exemplary findings are not new. Without the CEOS WGD's coordination and remarkable hard work in the early 1990s, a global archive of 1 km resolution AVHRR data from that era would never have been collected. This major project was quite innovative at the time, for example deploying mobile HRPT receiving stations as needed to achieve global data receipt. A major organizer at the CEOS WGD at that time was USGS's Tom Holm, now a Co-Chair of the LSI VC. Here is an extracted section, edited for readability in this document, from the 1-KM Project Website (<http://edc2.usgs.gov/1km/1kmhomepage.php>):

The Global Land 1-KM AVHRR data set project represents an international effort to acquire, archive, process, and distribute 1-km Advanced Very High Resolution Radiometer (AVHRR) data of the entire global land surface in order to meet the needs of the international science community. A network of 29 high resolution picture transmission (HRPT) stations, along with data recorded by the National Oceanic and Atmospheric Administration (NOAA), acquired daily global land coverage initially to be collected continuously for 18 consecutive months beginning April 1, 1992, and continuing through September 30, 1993. Subsequently the period was extended to September 30, 1996.

Under the guidance of the International Geosphere Biosphere Programme, processing standards for the AVHRR data were developed for calibration, atmospheric correction, geometric registration, and the production of global 10-day maximum normalized difference vegetation index (NDVI) composites. The major uses of the composites are related to the study of surface vegetation cover.

The International Geosphere Biosphere Programme-Data and Information System (IGBP-DIS) land cover working group completed a study that stressed the need for a this data set (Townshend, 1992). The United Nations Food and Agriculture Organization's Forest Resources Assessment 1990 Project required 1-km AVHRR data for all the forested lands on the planet, with emphasis on the tropical zones, for their global forest inventory mandate (FAO, 1990). NOAA researchers required a 1-km AVHRR data set of the northern hemisphere to study the urban heat island effects on surface observations of temperature data (Gallo et al., 1993). The Commission of the European Communities (CEC) and the European Space Agency (ESA) had a joint requirement for global, near daily, long-term, consistent optical and thermal satellite data for tropical environments in support of the joint Tropical Ecosystem Environment Observations by Satellite (1991) project. The NASA Moderate Resolution Imaging Spectrometer land science team concluded that a global land 1-km AVHRR data set was crucial to develop algorithms for several land products for the Earth Observing System (EOS) (Running et al., 1993).

The compilation of such a data set received endorsement from the Committee on Earth Observations Satellites (CEOS) Plenary, through the recommendation of the CEOS Working Group on Data (CEOS-WGD). CEOS Plenary endorsement facilitated

international cooperation ensuring participation and completion of the data set. NASA asked the U.S. Geological Survey (USGS), Earth Resources Observation Systems (EROS) Data Center (EDC) to coordinate the gathering and management of such a data set as a part of its role as the NASA EOS Land Processes Distributed Active Archive Center (LPDAAC).

5. SBA Self Study Preliminary Findings and Recommendations

The CEOS Societal Benefit Area Coordinators are positions added to the CEOS organization during the 2009-2009 tenure of NOAA, led by Mary Kicza. These Coordinators were created to coordinate the then very large number of CEOS actions assigned to CEOS WGs, etc., and CEOS POCs' participation in the various GEO Tasks categorized by SBA in the GEOSS Task Plan (communication by DCEO Kerry Sawyer at WGISS-32). However, as CEOS sees itself as the "satellite arm" of GEO and is a major provider of components and services of the GEO System of Systems, some SBA Coordinators have originated activities and now have SBA Teams.

The voluntary basis of participation with the CEOS SBA Coordinators is not well- or evenly-staffed by CEOS agencies. Some SBA coordinators are quite new.

It is difficult to find information about the CEOS SBA coordination activities. One questionnaire respondent stated that SBA Coordinators were on the agenda systematically to give general report presentations only once, at SIT-22 in Japan in 2008. A perusal of the SIT-22 agenda found that the Session was not in fact meant for general reporting, but was entitled CEOS SBA Coordinator Reports on CEOS-GEO Actions, with each SBA Coordinator allotted 5 minutes. Further research into this found that an attendee recalled that many of the SBA Coordinators spoke for longer, providing more information on their activities and progress. The presentations themselves vary in length, please see:

<http://www.ceos.org/images/general/sit22/presentations/Agenda%20Item%208%20SBA%20Presentations%20to%20SIT%2022%20v3.pdf>

Further, the view of the SBA Coordinators, including their functions, roles, contributions, and the need for them, by different CEOS community canvass individuals, including the SBA members themselves, was the area of least consensus found to date by the Study Team lead. In addition, a fairly pervasive view of SBAs as a group as inactive was found by the Study Team lead to be quite inaccurate. A lot of insight was gained by the Study Team Lead at the recent SIT-27 meeting, and the immediately preceding CEOS Disasters/Societal Benefit Area meeting.

An admitted exception currently is the CEOS Energy SBA Coordinator, as reported at SIT-27, reflecting a described GEO Energy SBA activity lull. As discussed above and as evidenced by the progress shown in the Energy section of the SIT-22 presentation linked above, this has not always been the case.

Finding: CEOS SBAs' activities found to be not well understood internally by CEOS members, and it is difficult to find information about them. SBAs'

Coordinators and are perceived as a group by many as inactive. An exception mentioned often was the Climate SBA Coordinator.

Consistent with this finding, during research and analysis for preparation of this report, it was difficult for the Study Team Lead to find even the correct current list of CEOS SBA areas (For example Weather is listed on the CEOS Website, was explained to be abolished as a CEOS SBA area by the listed Coordinator, and purported to never have existed in one interview conducted.), the correct SBA Coordinators, and finally, their correct email addresses. Interview requests were sent at various times, with a final one going out in very early September. A very high percentage of contacts to the SBA Coordinators met with very prompt response.

Finding: CEOS Website documentation minimal, except for Disasters SBA Team listing under “Special Teams” (along with Carbon Task Force). Disasters SBA Team very well populated. Other Coordinators expressed wish to have CEOS SBA progress documents online through CEOS Website.

Preliminary Recommendation: SBA Coordinators should work with the SEO to get better real estate on the CEOS Website and provide ongoing details of their SBA activities.

There appears to be general agreement that the roles, responsibilities, goals, and objectives of CEOS SBAs are not clearly defined for the SBA Coordinator or as seen internally by CEOS participants.

The Disasters SBA Team Home page at the CEOS Website contains the following leading paragraph:

“In 2008, CEOS created the CEOS Disaster SBA Team. This team is led by Guy Seguin, of the Canadian Space Agency, and is made up of all interested CEOS member agencies. Its role is to coordinate all CEOS actions with respect to disaster management. The current CEOS Action Plan includes a wide range of actions destined to contribute to the GEO Workplan 2009-2011....”

Preliminary Recommendation: SBA Coordinators should have a clearly articulated and publicly published statement of goals and objectives that are endorsed by the Plenary and SIT.

The self-described Disasters SBA Team presence on the CEOS website lists six current actions, including DI-09-02b_2 Satellite Data for the Caribbean Satellite Disaster Pilot. The Disasters SBA Team site home contains a CEOS 2010 movie entitled “Caribbean Satellite Disaster Pilot” that has a YouTube logo. The almost 8 minute movie contains a description of the Disasters Caribbean Satellite Disaster Pilot in its full context, a lot of information and advertisement of CEOS, Earth Observation satellites, the CEOS Disasters SBA team as well as the CEOS ACC and SEO, along with many other pertinent GEO groups, the International Charter, and SERVIR.

The Disasters SBA Coordinator included the GEO Caribbean Satellite Disaster Pilot Task 2011-2012 Workplan (available from the Disasters SBA Coordinator) as an Exemplary Product in response to the study's Community Canvass.

SBA Coordinators and teams serve variously as links between GEO and CEOS for GEO SBA Tasks, coordinating with the GEO Secretariat's SBA Leads and working with SBAs' "Communities of Practice".

6. Conclusions

With technology advances, new generations of instruments, calibration and validation capabilities, system and information technologies have provided new generational means of more advanced harmonization. Currently, a global Earth Observation "system of systems", where a user anywhere in the world could get products from all Earth Observation satellites consistently calibrated and validated, and provided through the portal of choice in any format requested is technologically achievable. The challenge that remains for CEOS are the harmonization of direction, priority and policy, and the application of needed resources that could forge the way.

The newer infrastructure within CEOS, including WGClimate, WGCBD, CEO, DCEO, SEO, VCs, and SBA Coordinators provides challenges in internal lateral coordination, but also good opportunities for concerted efforts towards substantive contributions in Earth Observations.

Study Team Report on Working Groups and SBAs – Appendix 1

CEOS Self Study Terms of Reference for STUDY TEAMS

Background

1. In order to help position the Committee on Earth Observation Satellites to tackle the challenges and opportunities ahead in providing coordination of civil space-borne observations of the Earth, the incoming SIT Chair has requested that CEOS undertake a Self Study to identify past successes, strengths, opportunities, and areas of challenge. The Self Study is further charged with identifying potential new initiatives for the coming years. Executive Leadership for this task resides with the incoming SIT Chair, Dr. Michael Freilich, Director of the Earth Science Division of NASA.

2. To conduct the work of the Self Study, a Steering Committee and three Study Teams have been convened. The Steering Committee provides the overall guidance and synthesis for the CEOS Self Study (CSS). The Study Teams, governed by these Terms of Reference, each evaluate a specific functional area of CEOS and report on their findings.

Objectives and Scope

3. The main objectives of the three Study Teams are to evaluate, and report on questions specific to their areas of focus: Executive functions; Working Groups and SBAs; and Constellations, respectively. Questions for the Study Teams are developed jointly by the Steering Committee and the Study Team Leads. Study Teams have latitude to conduct their work as best fits their focus areas, while maintaining coordination with each other and with the Steering Committee. The primary sources of input to the Study Teams are 1) existing CEOS documentation; and 2) broad canvassing of the CEOS community.

Overarching questions for consideration by the Steering Committee and past CEOS Leaders (and for consideration by the Study Teams as appropriate) include the following:

1. Does CEOS have clearly-defined goals and objectives that are aligned with its mission?
2. Are CEOS's objectives commensurate with the available resources (human, physical, fiscal, and informational)?
3. How does CEOS measure and document its progress toward goals?
4. What are CEOS's most important successes over the course of its history to date?
5. What are the most important opportunities for improvement in CEOS over the next 3-5 years?
6. What are the most important new initiatives for CEOS to set for the next 3-5 years?
7. Are there other points or issues that it would be beneficial for the CEOS Self Study to address?

Questions specific to each Study Team will be developed jointly by the Steering Committee and Study Team Leads, and may include (but are not limited to) the following:

Draft Questions for Study Team on Executive Functions:

- Are roles and responsibilities of the leadership groups clearly defined and well-understood?
- How are decisions made by CEOS?
- Is documentation of decisions and processes adequate and current?

- In what ways do the SEO, SIT, CEO, and SEO work together?
- Are there established processes for evaluating and responding to external requests from partners, clients, and customers?
- Are the business needs of CEOS commensurate with the number of available and willing participants?
- How does communication flow between CEOS leadership groups?
- How does communication occur between leadership groups and working levels?
- How does communication flow between CEOS and external partners, clients, and customers?
- Are there key ways in which decisionmaking and/or communication should be improved or modified?

Draft Questions for Study Team on Working Groups and SBAs:

- Are the roles, responsibilities, and goals of CEOS Working Groups and SBAs clearly defined?
- How much autonomy do Working Groups and SBAs have to set their scope and activities?
- Are there shared expectations regarding actions, deliverables, and outcomes?
- How is progress measured and documented?
- Is there an established process for enabling new Working Groups and SBAs?
- Is the pool of available and willing volunteers commensurate with the tasks established for each Working Group or SBA?
- How does communication occur among and within Working Groups and SBAs?
- How does communication flow between Working Groups, SBAs, and CEOS leadership bodies?
- Are there key ways in which the functions and activities of the Working Groups and SBAs should be improved or modified?

Draft Questions for Study Team on Constellations:

- Are the roles, responsibilities, and goals of the CEOS Virtual Constellations clearly defined?
- How do the Virtual Constellations conduct and document their work?
- Are there shared expectations regarding actions, deliverables, and outcomes?
- How is progress measured and documented?
- Is there an established process for enabling new Virtual Constellations?
- Is the pool of available and willing volunteers commensurate with the tasks established for each Virtual Constellation?
- How does communication occur among and within Virtual Constellations?

- How does communication flow between the Virtual Constellations and CEOS leadership bodies?
- Are there key ways in which the functions and activities of the Virtual Constellations should be improved or modified?

Schedule and Milestones

4. The CSS has a relatively rapid schedule, with a goal of producing a complete rough draft report by 29 August 2011.

To meet this schedule, Study Teams are required to submit very rough initial drafts of their reports no later than August 8, 2011.

CSS Milestones for all parties are as follows:

(Study Team major milestones are in red. All dates are 2011.)

| Date | Milestone | Who? | Status |
|---------------------|--|--------------------|-----------|
| 11 February | Study proposed | NASA | Completed |
| 16 February | Concept presented at CEOS Actions Meeting | NASA | Completed |
| 28 March | Initial contact with recent past CEOS leaders to request input | NASA | Completed |
| 10 May | Steering Committee members and Study Team Leads established | All | Completed |
| 25 May | Initial Steering Committee face-to-face meeting, Frascati | All | Completed |
| 02 June | Study Team Leads provide "Ideal Team" lists | Study Teams | Completed |
| 09 June | Rosters for Study Teams complete; Study Teams begin work | Study Teams | |
| 09 June | Finalize questions that will be sent to past CEOS leaders | Steering Committee | |
| 09 June | Regular teleconference meetings begin (2nd and 4th Thursdays) | All | |
| 16 June | Report outline complete and shared | Steering Committee | |
| 17 June | Study Team work plans developed and shared | Study Teams | |
| 21 June | Teleconferences with past CEOS leaders are completed | Steering Committee | |
| 08 July | Approach for review and refinement of Study Team Reports is defined | Steering Committee | |
| 15 July | Draft compilation of inputs from past CEOS leaders is completed | Steering Committee | |
| 20 July | Decision is taken: mid-September workshop/working meeting needed? | All | |
| 08 August | Very rough draft Study Team reports circulated | Study Teams | |
| 22 August | Distill Study Team reports and past leaders' input; extract major themes. Very rough draft Steering Committee outward-looking report due | Steering Committee | |
| 22 August | 2nd draft Study Team reports due | Study Teams | |
| 29 August | Complete CSS 1 st draft report out for comment and refinement | Steering Committee | |
| 15 September | Edits, refinements and comments due | All | |
| 23 September | Report distributed for concurrence | Steering Committee | |
| 06 November | Presentation of findings at Plenary | Steering Committee | |

Organization of Work

The Study Teams

5. Study Team Leads and Steering Committee members will both suggest members for the Study Teams. Study Team Leads are asked to provide their "Ideal Team" lists for discussion at the 09 June Steering Committee meeting. Upon consensus regarding Study Team membership, the Steering Committee and CEOS Leadership will communicate with those individuals' agencies to facilitate their participation. Team members will serve in an expert capacity and will work together to develop their Study Team's reports.

Study Teams will have latitude to conduct their work according to members' schedules and preferences while ensuring that milestones are met. Teams may choose to establish small internal working groups composed of one or two Team members to undertake specific tasks or to prepare input on specific topics for Team consideration. Because of the fast turnaround required for this task, while every effort should be made to accommodate all members' busy schedules, it is understood that if a member is unable to participate on a consistent basis, the activities of the team will go forward in his/her absence, and the team

may request that a replacement member be sought to ensure that a range of viewpoints and expertise as wide as possible remains represented.

Study Teams will communicate with one another, sharing drafts and salient information as needed to ensure a coordinated suite of reports. Members of the Rapid Writing Team must be able to think, reflect and write from a broad perspective. Team members will come from a range of agencies and organizations; however, it is required that their roles are not to serve as specific agency or organization representatives, but instead, to draw upon the breadth and depth of their professional knowledge of CEOS's structure, accomplishments, capacities, and needs, in order to craft a report that will be both timely and useful to CEOS as a whole.

Operational Support

6. Essential overall CSS support functions (e.g. project oversight, organizing meetings, maintaining and administering the CSS schedule) will be provided by NASA. Study Teams are to self-organize and work, but may rely upon the Steering Committee for consultation and help in resolving any large issues that might arise. Travel will be kept to a minimum, and Teams will make use of existing mechanisms for teleconferencing, web conferencing, email communications, and other occasions for consultation, knowledge sharing, and writing. Where face-to-face meetings requiring travel are deemed essential by the Study Team, travel costs for each member will be borne by each member's home agency or organization.

Outputs

8. The Study Teams will provide to the Steering Committee and each other the following outputs:

- | | |
|--|-----------------------|
| 1. Brief work plan with Study Team's major milestones | NLT 17 June 2011 |
| 2. 1 st rough draft Study Team reports circulated | NLT 08 August 2011 |
| 3. 2 nd draft Study Team reports due | NLT 22 August 2011 |
| 4. Final draft reports due | NLT 15 September 2011 |

In the course of the Study Teams' work, the Team Leads will provide progress reports and status updates to the Steering Committee at their regular telecons.

Team

The Study Team Leads are:

Ivan Petiteville – Study Team Lead for Executive Functions
Martha Maiden – Study Team Lead for Working Groups and SBAs
Stephen Ward – Study Team Lead for Constellations

Appendix 2. Study Team on Working Groups and Societal Benefit Areas: Process

Organization

The Study Team on WGs and SBAs Lead organized a Study Team, to provide representation of the WGs and SBAs beyond her own Role as WGISS Member, 2008-2009 WGISS Chair, former WGISS member (from inception to approximately 2002), and former WG Data member (from 1991 to merger into WGISS).

Study Team Members

| Name | Agency or Organization | Role in CEOS |
|-----------------|-------------------------------|---|
| Changyong Cao | NOAA | WGCV Member, 2007-2008 WGCV Chair |
| Murielle Lafaye | CNES | Health SBA Coordinator |
| Pascal Lecomte | ESA | WGClimate Member, 2008-2009 WGCV Chair, |
| Osamu Ochiai | JAXA | Water SBA Coordinator, former WGISS Member, former secondment GEO Secretariat |
| Terence Van Zyl | CSIR | 2010-11 WGISS Technology Subgroup Chair |

Methodology

Study Team Lead consulted with Study Team, advising on proposed procedures and providing draft materials. Study Team Lead provided (albeit limited) schedule time for comment and suggestion from the Study Team in order to improve materials, process, and products.

Lead was trying by this two-pronged organization and methodology of Study Team involvement, comment, and review of materials separate from community member canvas via questionnaire and interviews to achieve the most objective and complete Study Team analysis and report. The Study Team Lead perspective cannot likely be overcome, but hopefully the Report provides a “true” Self Study perspective.

A unavoidable negative consequence of this approach has been a compressed schedule, and therefore the need for a late delivery of a Final Study Team Report to the Steering Committee schedule. Steering Committee Lead has been flexible in changing the initial due date of the report to state "Draft Study Team Report", enabling this second late delivery.

Request for Involvement Study Team

Study Team Lead note:

This email was sent to the entire group of this Self Study Team on June 17, 2011, along with the following attachments:

1. CEOS Self Study Status Report 2011 05 25.pdf (Steering Committee document)
2. Ideal Study Team, WGs_SBAs.doc
3. Draft Questions for Study Team on Working Groups and SBAs.pdf
4. WG and SBA Canvas Community Members_1.doc

As stated in the Methodology section of the Study Team Report to the Steering Committee, correspondence received in reply was helpful in improving and organizing the Draft Questions into the Questionnaire used in the Study.

Hello,

I think all of you must have heard about the CEOS Self Study that has just been kicked off. NASA initiated this Self Study in preparation for taking on the role of the CEOS SIT Chair in November 2011. The Self Study Steering Committee gave the Study Team leads an action to provide a "wish list" of their Ideal Study Team membership, and I have identified you as Ideal Study Team Members for the Working Groups and SBAs Study Team, of which I am the Lead.

The CEOS Self Study is envisioned examine its accomplishments and lessons learned during its first 25 years of existence. A close examination of this kind will benefit CEOS going forward to continue with activities that are succeeding, to address challenges, and enable the most effective prioritization and undertaking of new initiatives. Most importantly, focusing on CEOS' achievements, lessons learned, and challenges, will lay the foundation for CEOS to support and facilitate the highest levels of effectiveness and efficiency in the coming years.

The Self Study has two main components – three Study Teams, each of which will focus its analysis on Constellations, Working Groups and SBAs ("our" Study Team) and Executive Functions, and a Steering Committee that will guide and coordinate the development of the final report. (See attached CEOS Self Study Contacts attached for members).

The idea of the Study Team is to provide them questions that are developed jointly by the Steering Committee and the Study Team Leads. Study Teams have latitude to conduct their work as best fits their focus areas, while maintaining

coordination with each other and with the Steering Committee. The primary sources of input to the Study Teams are 1) existing CEOS documentation; and 2) broad canvassing of the CEOS community.

My strategy is to have a small Study Team with which to collaborate with me in developing the questions and the list of members of the broad CEOS community to canvas. I would also like to collaborate with you in developing the report that comes from the material received in answering these questions and in compiling a bibliography of relevant existing CEOS documentation and its analysis. You can participate as you have time. I will communicate through email, and provide a few opportunities (polling for best times) for international telecons with you all.

You may have already been contacted by Ivan Petiteville and/or by Stephen Ward to answer questions for their Working Groups. Many of us will be participating in the Self Study in multiple ways. Being a member of this team gives you an opportunity to shape the Working Group and SBA Self Study report in a more fundamental way: by providing me questions for polling, any ideas you would like me to include, and the opportunity to contribute to or edit the report, the rough-draft of which I will provide to the Steering Committee in the August timeframe.

I do hope you will agree to work with me as the Working Group and SBA Study Team. I will move forward involving you, and do understand that you will participate as your time allows. I am fully responsible for the Study Team report, so you need think of this as an opportunity but not a burden. If you do not wish to further participate and consider receiving further email, let me know and I will remove you from the Study Team and so report to the Steering Committee.

I am optimistic that each of you in “dream team” will find this an interesting activity and enthusiastically consent to participate! I am enclosing two documents for your perusal and invite you to sent me your additions, comments, edits to each over the next ten days, by Tuesday June 28, 1600UTC.

1. Draft questions for the WG/SBA Study broad canvassing of the CEOS community
2. Initial community to be canvassed.

When you have some time, please take a look and send me your ideas for questions or individuals to add to the community canvas list. I will begin to finalize material on late afternoon on Tuesday July 28, then sending it to you all, the Steering Committee and other Study Team Leads. I shall begin the canvas shortly thereafter.

I shall endeavor to involve you for your ideas and contributions, based on your involvement in and knowledge of the Working Groups and SBAs with the least burden upon your time. Please feel free to contact me.

Best wishes,
Martha

Nominal Email to with Community Canvas Individuals accompanying Questionnaires

Study Team Lead note: The large majority of these questionnaires were sent on August 12 and August 15, hence the community members did not have a luxury of a long interval to formulate replies. Several too me SBA members were successfully sent much later, with later due dates needed, as I recovered sending to incorrect addresses, incorrect individuals. In one instance I belatedly found out about an CEOS SBA assignment existing. The community canvas members were heroic in their completion and return of questionnaires, with a very high percentage of return. Follow-on communications and several interviews were held.

Nominal text of email, adapted for each individual email:

Hello _____,

You may have heard about the CEOS Self Study that is ongoing. NASA initiated this Self Study in preparation for taking on the role of the CEOS SIT Chair in November 2011.

The CEOS Self Study is examining its accomplishments and lessons learned during its first 25 years of existence. It is expected that a close examination of this kind will benefit CEOS going forward to continue with activities that are succeeding, to address challenges, and enable the most effective prioritization and undertaking of new initiatives. Most importantly, focusing on CEOS' achievements, lessons learned, and challenges will lay the foundation for CEOS to support and facilitate the highest levels of effectiveness and efficiency in the coming years.

The Self Study has two main components – three Study Teams, each of which will focus its analysis on Virtual Constellations, Working Groups and Societal Benefit Areas, and Executive Functions, and a Steering Committee that will guide and coordinate the development of the final report.

I am the Study Team Lead for Working Groups and Societal Benefit Areas. I have put together a small Study Team with which to collaborate with me in developing the report in this area to go to the Steering Committee for integration in the final report. You may know one or more of these individuals: Osamu Ochiai, JAXA; Murielle Lafaye, CNES; Terence van Zyl, CSIR; Pascal Lecomte, ESA; and Changyong Cao, NOAA.

Our Study Team has identified you as a key community member to canvas with our constructed questionnaire. Please take the time to fill out this questionnaire, and to return the questionnaire to me via return email by close of business August 31 at the latest. Be advised you need not answer every question, but only those that pertain to your experience. Also, please feel free to add, e.g after the last question, any additional comments, ideas, suggestions, and insights you may bring to bear that you think may be helpful.

If you would be interested in talking with me via phone as an interview, instead of or in

addition to answering the questionnaire, please let me know. I would like to interview you. And, it may seem an easier and richer way to provide your information and experience. I will endeavor to make myself available at your convenience.

You may have already been contacted by Ivan Petiteville and/or by Stephen Ward to answer questions for their Study Teams. Many of us will be participating in the Self Study in multiple ways. Thanks in advance for your contributions, and especially if this is double-duty for you.

Best wishes,
Martha Maiden
Former Chair, CEOS WGISS

Appendix 3: Broad CEOS Community Members For Working Groups and SBAs Canvass

All current WG Chairs, Vice-Chairs, Subgroup Chairs

WG Climate

X Mark Dowell, EC/JRC

X John Bates, NOAA received questionnaire

WEdu

Tania Maria Sausen, INPE

X George Jungbluth, NOAA

WGCV

X Gregory Stensaas, coordinated WGCV response

Bojan R. Bojkov, ESA

Jean-Christopher Lambert, BIRA-IASB

X Nigel Fox, National Physical Laboratory, UK received questionnaire, volunteered interview

X Joanne Nightingale, NASA received questionnaire, held interview

Gabriela Schaeppman-Strub, Inst of Evolutionary Biology & Environmental Studies

Xialong Dong, Chinese Academy of Sciences

Manfred Zink, DLR

X Jan-Peter Muller, University College London received questionnaire

X Added Carol Johnson, NIST received questionnaire

WGISS

X Pakorn Appaphant, GISTDA received questionnaire: coordinated WGISS response, plan to interview

Satoko Miura, JAXA

X Francis Lindsay, NASA received questionnaire

Martin Yapur, NOAA

Guoqing Li, CEODE

All Current SBA Coordinators (updated from material obtained originally from CEOS Website {partially updated through communication with SEO})

| | | | |
|------------------------|------------------------|----------------------------|----------|
| X Agriculture | Brad Prasad | Reed Thenkabail | USGS |
| Climate | Mitch | Goldberg | NOAA |
| X ^ Disasters | Guy | Seguin | CSA |
| Ecosystems | Asanda | Ntisana | SANSA |
| X ^ 0 Energy | Richard | Eckman | NASA |
| X Health | Murielle | Lafaye | CNES |
| X Water | Osamu | Ochiai | JAXA |
| X Weather * | Paul | Counet | EUMETSAT |
| X Cross-Cutting | Ivan | Petiteville | ESA |

X Biodiversity **

Martin

Wegmann

DLR

*no longer exists **not originally on CEOS Website

Key Current WG and SBA members, including:

Eric Lindstrom, NASA, member WG Climate

Wyn Cudlip, UK, member WGISS

X Lyndon Oleson, USGS, member WGISS received questionnaire, held interview

Key Past Working Group and SBA leads and members, including:

Gordon Bridge, Eumetsat (WEdu)

Ken McDonald, retired NASA and NASA (WGISS)

Other Study Team Leads

Ivan Petiteville

Stephen Ward, 2011 CEOS support team, long-time involvement in CEOS via support to many former CEOS Chairs and CEOS SIT Chairs, held interview

Other key CEOS community members (and former CEOS):

X Julio Dalge, INPE received questionnaire, plan to interview at SIT did not materialize

Jean-Louis Fellous, currently Exec Dir of COSPAR

Maiden also

- sat in on Steering Committee interviews of Lisa Shaffer and Greg Withee

- supplied supplemental questions to Brian Killough for interview with Pontsho Maruping.

KEY:

X received questionnaire

^ supplied exemplary product per questionnaire

0 plan to interview

APPENDIX 4: Community Canvas Individual Responses Redacted

CEOS Self Study Study Team on Working Groups and Societal Benefit Areas Questionnaire

Introduction

In preparation for NASA taking on the role of the CEOS SIT Chair in November 2011, Dr. Michael Freilich proposed that CEOS embark on a self study to examine its accomplishments and lessons learned during its first 25 years of existence. A close examination of this kind will benefit CEOS going forward and help NASA to effectively lead CEOS activities that are succeeding, address challenges, and guide new initiatives. Most importantly, focusing on CEOS' achievements, lessons learned, and challenges, will lay the foundation for CEOS to support and facilitate the highest levels of effectiveness and efficiency in the coming years.

The self study will consist of two main components – the three Study Teams, each of which will focus its analysis on Virtual Constellations, Working Groups and Societal Benefit Areas, and Executive Functions, respectively, and a Steering Committee that will guide and coordinate the development of the final report.

The questions comprising questionnaire were created in part by the Steering Committee and provided to all three Study Team Leaders, and ones created by this Study Team uniquely. These have been loosely organized.

ANNEX: Detailed Questions and Answers

Questions 1. CEOS Voluntary Basis

| <u>Question 1.1: Is the pool of available and willing volunteers commensurate with the tasks established for each Working Group or SBA?</u> | |
|--|--|
| Respondent 1[†] | <p>The pool of volunteers is relatively adequate. However, there is a significant disproportion with the distribution of volunteers amongst the tasks and working groups. However, if the pool was expanded and included representatives from CEOS partners many more goals could be achieved and achieved more quickly.</p> <p>Your inputs</p> <ul style="list-style-type: none"> • Yes and No. By that I mean some of the Working Group tasks are well supported and sustainable while others struggle with gaining sufficient membership support. • On balance generally yes. However, if the pool was expanded and included representatives from CEOS partners many more goals could be achieved and achieved more quickly. • The pool of volunteers is relatively adequate. However, there is a significant disproportion with the distribution of volunteers amongst the tasks and working groups. • Yes • Generally no, although some specific tasks can get adequate support. • Not enough. |
| Respondent 2 | I do not have a lot of experience yet with COES and so will do my best. Like all voluntary efforts, there is a core group of individuals who do most of the work. SBA efforts are good for climate, however, that effort should be folded into the WGClimate over the next few years. |
| Respondent 3 | For the last 2 years the tasks assigned to the Weather SBA Coordinator have been minimal, or non-existent, as no specific GEO weather-related actions have been identified of relevance (i.e. none assigned to CEOS). |

| <u>Question 1.1: Is the pool of available and willing volunteers commensurate with the tasks established for each Working Group or SBA?</u> | |
|--|---|
| | As a result it was agreed to suppress the role of CEOS Weather SBA Coordinator at SIT-26. |
| Respondent 4 | WGCV: yes, to all subgroups. WGISS: yes, when it comes to the Web Services Interest Group, but not necessarily to other subgroups. WGEdu: yes, but the future is uncertain with the proposed new plans and activities for the group. |
| Respondent 5 | In this initial phase WGClimat members were assigned by CEOS member agencies. My impression is that the current membership is adequate for the initial tasks of the WG and includes a good representation both across the land, ocean and atmosphere domains (to a lesser extent land) and across competences in systems engineering, cal/val, algorithm development and climate applications and modeling. |
| Respondent 6 | No! This is probably the most significant issue with the energy SBA. When the SBA teams were established within CEOS to mirror the GEO SBA communities of practice (CoP), I chose to leverage the existing volunteer base in the GEO energy CoP, rather than create a new group. I augmented this group with a few other space agency representatives. The GEO energy SBA was still rather active with multiple tasks occurring within NASA, USGS, ESA, DLR, and at several universities. Many of the NASA tasks were funded by Applied Sciences. For reasons still not wholly clear to me, the GEO/CEOS combined energy SBA gradually became less active. The leads of the GEO energy SBA were occupied with other activities and devoted less time to the organization. I could never generate a lot of excitement to carry on the activities. NASA funds dried up so that my Langley colleagues (and those at other NASA centers like Goddard) ended their tasks and no follow-ons were established. Despite activity in Europe, funded by FP7 and other initiatives, there's been decreasing amounts of interagency collaboration. So, the volunteer nature of this activity is a real problem. Probably more importantly, the decrease in NASA funding has led to the closure of several of NASA-led CEOS energy tasks that had cross-agency linkages. |
| Respondent 7 | No not really. Whilst significant achievement is made by the few, it is difficult to achieve the goals and tasks efficiently and quickly particularly if the short-term objective don't match with existing projects. The "volunteer" nature of the process makes it difficult for already fully committed individuals to devote resources elsewhere. When real "cash or |

| <u>Question 1.1: Is the pool of available and willing volunteers commensurate with the tasks established for each Working Group or SBA?</u> | |
|--|--|
| | equivalent resource” is required it is often a major challenge to obtain particularly if it involves combining resources from more than one agency to deliver a common international benefit. – e.g. comparisons, QA4EO secretariat maintenance, development of case studies etc. It is true to say that some of the above problems stems from the WGs having greater ambition and desire for cooperative working and sharing. |
| Respondent 8 | I don’t think I am in a position to accurately answer this question. |
| Respondent 9 | There are not enough volunteers/active parts of the WG to realize the goals that the WG set out. The goals that were set out by the WG were similar to goals of participating agencies. Things were getting accomplished, but they were not necessarily being tracked or coordinated in the WGEdu. The WG focused more on the individual agency accomplishments rather than group accomplishments and goals. |
| Respondent 10 | Yes, point of contacts in the contributing space agencies are identified |
| Respondent 11 | On balance generally yes. However, if the pool was expanded and included representatives from CEOS partners many more goals could be achieved and achieved more quickly. |
| Respondent 12 (also see interview) | Marginally. I think historically the tasks and projects with the most general interest and/or promise have been fairly well supported and maybe that is the best way of allocating those resources. A few agencies have been consistent in their support but it has also been the case that individual agency support typically rises when the Principal has a particular role, e.g. CEOS Chair, SIT Chair, etc. Sometimes this support is sustained, sometimes not. |
| Respondent 13 | No. In most cases it is the same pool of people across the board, many already over committed. |
| Respondent 14 | Depends on each WG and SBA member’s willingness or member agency’s project basis |
| Respondent 15 | It depends on the year: resources allocated by agencies may vary from year to the next. Currently, both WGISS and WGCV for instance cannot do all what is requested by Plenary by lack of resources (QA4EO, portals, interface to GCI, etc..). |
| Respondent 16 | A: On the disaster SBA team it is, but it vary a lot from agency to agency. |
| Respondent 17[†] | General comments: 1) the CEOS WGs do not get sufficient time to present issues and strategic actions within SIT or Plenary. WGCV does not get actions or issues solved by SIT or Plenary. 2) Need first focus on CEOS needs/requirements versus everyone else's requirements. |

| <u>Question 1.1: Is the pool of available and willing volunteers commensurate with the tasks established for each Working Group or SBA?</u> | |
|--|---|
| | <p>3) Need to define a better process for GCOS input.</p> <p>4) Need more support from CEOS SEC and agencies at working group level.</p> <p>5) Need a joint agency CEOS funding process and/or GEO task support funding process.</p> <p>No. The support from agencies is usually okay for attending WG and SG meetings; however, the dedicated funding to accomplish needs is limited, especially in near term tasks where funding and effort is needed. Agencies do not provide dedicated resources beyond normal efforts so additional support for a common international goal is hard to pull together.</p> <p>No. Volunteerism is noble, but big tasks left undone as without investment in full time staffing very little can be achieved.</p> |
| Respondent 18 | |
| Respondent 19 | |
| † Respondents 1 and 17 sent coordinated WGISS and WGCV responses. | |

| <u>Question 1.2: How does communication occur among and within Working Groups, SBAs, and VCs?</u> | |
|--|---|
| Respondent 1† | <p>WGISS is viewed as a support body to enable technologies and systems that increase the effectiveness of the SBA and VCs. Atmospheric Composition is one excellent example. WGISS maintains a fairly effective system of communications between the WG and the various SBA and VCs. WGISS and WGCV have annual joint meeting. WGISS and VC/SBAs, communication is done through each GEO task (or CEOS Action). Regarding some VCs/SBAs, communications are very limited or almost nothing.</p> <p>The means of communication are primarily conducted through email, telecons, video conferences, and the use of web-based technology followed up by face-to-face interactions at the scheduled Working Group or Virtual Constellation meetings.</p> <p>Your Inputs</p> <ul style="list-style-type: none"> • Primary communications are conducted through email, telecons and video conferences followed up by face-to-face interactions at the scheduled Working Group or Virtual Constellation |

| <u>Question 1.2: How does communication occur among and within Working Groups, SBAs, and VCs?</u> | |
|--|--|
| | <p>meetings.</p> <ul style="list-style-type: none"> • WGISS maintains a fairly effective system of communications between the WG and the various SBA and VCs, though not all are represented in our work (see question 1.1). WGISS is viewed as a support body to enable technologies and systems that increase the effectiveness of the SBA and VCs. Atmospheric Composition is one excellent example. • Communications have improved significantly. The use of web-based technologies such as GoToMeeting, Webex, Skype, etc has impacted positively the flow and frequency of communications and has reduced the limitations of VTC or Teleconference from specific locations. • Email, Telecons • Telecon, emails and face to face discussion at meetings. Video conferences are rare. • WGISS and WGCV have annual joint meeting. WGISS and VC/SBAs, communication is done through each GEO task (or CEOS Action). Regarding some VCs/SBAs, communications are very limited or almost nothing. |
| Respondent 2 | For SBA and WGClimate there is good interaction. WGClimate is new and has yet to interact much with VC |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | <p>Within: it works based on a few meetings, telecons and mailing list.</p> <p>Among: it works based on joint meetings, with WGCV, WGISS and LSI, but WGEdu has no interaction with the other WGs. However, WGEdu has been discussing a new approach for working more closely with WGISS regarding data access and availability.</p> |
| Respondent 5 | <p>At our first meeting we discussed internal networking required with other CEOS entities (WGs, VCs and SBAs). As a general comment we have several members in the WG whom are wearing multiple hats (i.e. both WGClimates and either members of another WG or a VC). I am convinced that this type of cross-fertilisation is the most effective form of interaction with the other WG and VCs especially in this initial phase.</p> <p>Furthermore probably the most important link at present is with the Climate SBA. Mitch Goldberg (Climate SBA lead) is a member of WGClimate and the WGClimate explicitly identifies the links with the Climate SBA. At present the fundamental link is the WGClimate will act as a review body for the CEOS response to the GCOS IP that is being produced by the Climate SBA</p> |
| Respondent 6 | Within the SBA, communication has been largely by e-mail. Our last GEO energy CoP face-to-face meeting was at |

| <u>Question 1.2: How does communication occur among and within Working Groups, SBAs, and VCs?</u> | |
|--|---|
| | <p>IGARSS in 2007. I've been advocating organizing another meeting at the GEO Secretariat to re-invigorate the group. Another issue is the change in assignments at the GEO Secretariat for those overseeing the SBAs. Alexia Massacand was our initial contact and we benefitted from her enthusiasm. Others have been less proactive, although Fernando Ramos tried valiantly. I'm corresponding with Humbulani Mudau to see if we can get things moving. The only connection with VCs has been with ACC, initially with Ernie Hilsenrath. I'm currently co-lead of ACC, but I don't see any obvious synergies between the energy SBA and ACC at present.</p> |
| Respondent 7 | <p>Most progress is made through discussions and commitments at formal meetings. Some (particularly for focused activities like development of QA4EO) progressed because of regular telecons amongst a task group. My IVOS sub-group is now trying to get more "between meeting" activities by subdividing activities into task groups with a "champion" and encouraging email/telecons to progress.</p> |
| Respondent 8 | <p>For my limited role, which has been to represent NIST at the WGCV meetings, communications occur before the meeting and in the production of the meeting reports.</p> |
| Respondent 9 | <p>Attended annual meetings and the CEOS Secretariat teleconferences. Limited emails and teleconferences. There were side meetings at GEO and USGS workshops. There was no coordination with WGISS.</p> |
| Respondent 10 | <p>Via email and during CEOS meetings</p> |
| Respondent 11 | <p>WGISS maintains a fairly effective system of communications between the WG and the various SBA and VCs, though not all are represented in our work (see question 1.1). WGISS is viewed as a support body to enable technologies and systems that increase the effectiveness of the SBA and VCs. Atmospheric Composition is one excellent example.</p> |
| Respondent 12 (also see interview) | <p>In addition to the regular meetings, project/task team and Exec. telecons and more recently WebEx/GotoMeetings have been the mainstay for communication within WGs, SBAs and VCs. I think communication among groups has relied more on individuals from one group attending the meetings of another but WebEx style workshops have occurred and should be considered more widely.</p> |
| Respondent 13 | <p>Within WG: Sporadic email and WG meetings (6-9months for WGCV). Unsure of communication across WG's and SBA's / VC's, I didn't know SBA's existed until just recently and am unsure of their purpose. I am also still uncertain of the role of VC's, their leadership, structure and goals beyond broad statements mentioned on the CEOS webpage....</p> |
| Respondent 14 | <p>frequent e-mail, phone call, telecon and meeting</p> |
| Respondent 15 | <p>Could be improved</p> |

| <u>Question 1.2: How does communication occur among and within Working Groups, SBAs, and VCs?</u> | |
|--|---|
| Respondent 16 | A: Mostly by e-mails. Because of time difference teleconference are not always successful. Meetings are essential to maintain cohesion of the team. One on one with some member proved to be very useful. |
| Respondent 17[†] | <p>Good communication via WGCV and SGs; however, need more support via SBA's and VC's. The WGISS and WGCV joint meeting is very useful and WG tries to attend WGISS meeting for cross-proliferation and this needs to happen more. WGCV needs support from WGEdu!</p> <p>WGCV has established WGCV liaisons for each VC and we are trying to keep up with all the efforts. However, volunteer time continues to determine effort and involvement. Recommend liaisons and I would suggest that SBAs and VCs make sure they keep WG pocs in their invites and emails.</p> <p>WGCV does not have good CEOS SBA understanding or contact.</p> <p>Through CEOS, GEO meetings and telecons.</p> <p>Email (sometimes conference calls)</p> |
| Respondent 18 | |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 1.3: Are there means by which new members are adequately encourage to become more fully engaged in the Working Groups and SBA Teams?</u> | |
|---|--|
| Respondent 1[†] | <p>At the scheduled meetings there are usually a call for support or interest for new participants. Often WGISS members attempt to craft tasks and projects that are complementary to the new member's interests and skills. In addition, during the last couple of years we have noticed a more aggressive flow of information coming from the CEO and SEO. CEOS newsletters and meeting reports posted on the website can be a critical source of information that provides the necessary means for engagement.</p> <p>Your inputs</p> <ul style="list-style-type: none"> • At the scheduled meetings there are usually a call for support or interest for new participants. |

| <u>Question 1.3: Are there means by which new members are adequately encourage to become more fully engaged in the Working Groups and SBA Teams?</u> | |
|---|--|
| | <ul style="list-style-type: none"> • I cannot speak to the SBA teams but within WGISS there is a common practice to encourage and invite new members to participate. Often WGISS members attempt to craft tasks and projects that are complementary to the new member's interests and skills. • During the last couple of years we have noticed a more aggressive flow of information coming from the CEOS Executive Office and their Working groups. I believe the newsletters and meeting reports posted on the website are a critical source of information that provides the necessary means for engagement. Once again, web-based services provide near ideal environments to initiate any type of forums within each desired group. • No • New members are heavily encouraged to get involved with working group activities • To encourage participating one or more interest group or project. |
| Respondent 2 | Again, WGISS is new and we are struggling a bit with how to engage. |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | Exposing the major outcomes of each WG would make a strong point and could encourage new initiatives. However, it usually depends on a volunteer-based effort or on the willingness of a space agency to contribute. |
| Respondent 5 | There is some discussion to which degree we should involve the academic community as members to the WG. This will not happen in this initial phase. |
| Respondent 6 | I suppose that it depends on one's agency and their "reward" structure. At NASA, Applied Sciences has encouraged engagement with GEO and CEOS and has typically supported travel to relevant meetings. But, I've found personally that it's been something that I just enjoy doing and find fulfilling. But many are doing this on the side of their day jobs, so it's not a high priority. Unless agencies actively encourage participation (and, more importantly, fund participation of researchers in tasks either through directed or competitive solicitation), it's going to be difficult to increase activity. |
| Respondent 7 | Yes I think at working group and sub group level this is done as best can be. Push from Agency leads helps and an active programme where they can contribute helps. I guess we could do with better promoting what we do and how it can both impact and help agencies so they can see the need to influence and also identify immediate benefits. |
| Respondent 8 | As a representative of a National Measurement Laboratory, our attendance and potential contributions occur at a |

| <u>Question 1.3: Are there means by which new members are adequately encourage to become more fully engaged in the Working Groups and SBA Teams?</u> | |
|---|---|
| | fundamental (e.g. instrument characterization) level. How to best support the WGs and SBAs given our limited scope is a challenge in my view. Funding permitting, we have tried to support the WGCV over the years and identify staff members who can travel and represent NIST at the regular WGCV and IVOS subgroup meetings. |
| Respondent 9 | New CEOS members hear at Plenary about the opportunities to engage. At the WGEdu meetings and data democracy meetings, there was encouragement for others to join. There were no formal POC's for CEOS involvement for new members. |
| Respondent 10 | SBA Coordinator proposes regularly common actions, but it is difficult to have feedback because of constant overload of PoC. |
| Respondent 11 | I cannot speak to the SBA teams but within WGISS there is a common practice to encourage and invite new members to participate. Often WGISS members attempt to craft tasks and projects that are complementary to the new member's interests and skills. |
| Respondent 12 (also see interview) | This generally has been the task of the leadership of the individual WG or SBA team and at least in the case of WGISS, I believe this role has been taken very seriously. |
| Respondent 13 | Not that I am aware of. |
| Respondent 14 | not at this point |
| Respondent 15 | No real efficient means; just some statements; participation to either a WG, a VC, etc . could become a new criteria for accepting CEOS Members and Associates |
| Respondent 16 | A: Support at the level of the CEOS principal and funding inside their organization tends to encourage engagement. |
| Respondent 17[†] | We trying to do this in the WG and the SGs but as you can see both WGCV and WGISS are looking for vice chairs. Need help in promoting and outreach! Need support from SEC and SIT and CEOS agency members. We are getting so spread out with VC SBA WG GCOS..... |
| | How did we do it with WGs only (and it worked well) for so long. We should look at the infrastructure and how we integrate and work together. Not develop a new infrastructure every couple of years. We need an infrastructure that adapts to change. |

| <u>Question 1.3: Are there means by which new members are adequately encourage to become more fully engaged in the Working Groups and SBA Teams?</u> | |
|---|---|
| Respondent 18 | It takes some time for new members to understand the process and some people drop out at that stage. There is a need for continuity. So, group can bond and contribute. |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 1.4: Are Working Groups and SBA Teams sufficiently responsive to current and anticipated future stakeholder needs?</u> | |
|---|--|
| Respondent 1[†] | <p>WGISS tries very hard to be responsive – commensurate with available resources but their level of expertise affords them the ability to tackle complex challenges with significant anticipation. The group is also pre-active in trying to anticipate future stakeholder needs. A good example is the development of CWIC. WGISS team members identified the need for a common approach to the issue of system interoperability and used the collaborative framework of CEOS to enable development.</p> <p>Your inputs</p> <ul style="list-style-type: none"> • The Working Group I participate in tends to be fairly responsive to current stakeholder identified needs. It is always difficult to judge future needs. • I believe WGISS is responsive future needs, and is often proactive in discerning what these needs may be. A good example is the development of CWIC, an interoperability tool for seamlessly searching data across CEOS partners. WGISS team members identified the need for a common approach to the issue of system interoperability and used the collaborative framework of CEOS to enable development. <p>I would encourage more collaboration between the WGs to explore and possibly vet WG projects and initiatives.</p> <ul style="list-style-type: none"> • According to my WGISS experience, the group is not only sufficiently responsive but their level of expertise affords them the ability to tackle complex challenges with significant anticipation |

| Question 1.4: Are Working Groups and SBA Teams sufficiently responsive to current and anticipated future stakeholder needs? | |
|--|--|
| | <ul style="list-style-type: none"> • Yes • The Working Group tries very hard to be responsive – commensurate with available resources. It is also pre-active in trying to anticipate future stakeholder needs. • I do not think so. At least WGISS seems to be lacking resources to respond all the related needs. |
| Respondent 2 | Yes, I think so. |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | Yes, it is sufficiently responsive to current needs, but not necessarily responsive to anticipated future needs, mainly because the teams are usually overloaded with current activities. |
| Respondent 5 | Stakeholders explicitly identified concretely in ToR. Intimately linked and responsive to GCOS. |
| Respondent 6 | With energy, we've been tied into the GEO UIC activity (US-09-01a) and have a good understanding of stakeholder needs. |
| Respondent 7 | I think it is very difficult to be responsive and anticipate without any simpler more efficient means of assigning resources to an activity. |
| Respondent 8 | One need is the requirement for very accurate and stable measurements. The challenge in addressing the gap between current best practice and climate change requirements is to ensure the results of new research, development, training, and measurement intercomparisons are implemented by the community. This is a broad and difficult topic and I think more thought and work needs to be done to address this issue. |
| Respondent 9 | Data democracy transition in the WGEdu is an example of being responsive to future stakeholders. |
| Respondent 10 | Not enough, this point should be emphasized. |
| Respondent 11 | I believe WGISS is responsive future needs, and is often proactive in discerning what these needs may be. A good example is the development of CWIC, an interoperability tool for seamlessly searching data across CEOS partners. WGISS team members identified the need for a common approach to the issue of system interoperability and used the collaborative framework of CEOS to enable development. |
| Respondent 12 (also see interview) | <p>I would encourage more collaboration between the WGs to explore and possibly vet WG projects and initiatives.</p> <p>I would say yes, within the resource limitations already noted.</p> |

| <u>Question 1.4: Are Working Groups and SBA Teams sufficiently responsive to current and anticipated future stakeholder needs?</u> | |
|---|--|
| Respondent 13 | Uncertain (no experience with this). |
| Respondent 14 | For Water SBA, currently fully supportive to the GEOSS Water Tasks which include Asian and African river basin authorities |
| Respondent 15 | Currently there are examples of slow response not due to bad will (on the contrary) but simply by lack of resources |
| Respondent 16 | A: If we assume that the GEO workplan represent the stakeholder needs we can probably say that we are sufficiently responsive. However work need to be done to translate the GEO workplan in satellites system requirements and resource to help at the SEO are limited. |
| Respondent 17[†] | Try to be but very hard to be responsive if agencies don't provide resource and volunteers are limited. Also, we need more involvement in the prioritization of the CEOS needs by SEC/SIT. |
| Respondent 18 | As far as the volunteerism allows. All SBA's have day jobs and significant other commitments. So, they can't be asked to put in too much time into CEOS unless it gets substantial more time allocations, resource allocations, and recognition. |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 1.5: Can you suggest any improvements that would facilitate the vertical communications from/to the CEOS Chair and SIT to/from those at the most basic working levels (Subgroups, SBA task teams)?</u> | |
|---|---|
| Respondent 1[†] | <ul style="list-style-type: none"> Allocating the Working groups to have a more tangible presence at the annual Plenary meeting. Tangible in terms of time allotted. Continued representation from SIT and CEOS Executive membership at the Working Group meetings to allow better two-way understanding of what is needed by, and what may be possible from, the Working group. Encouraging internal communications within each agency (between WG participants and SIT/Plenary participants) <p>Your inputs</p> <ul style="list-style-type: none"> Two thoughts here. One would be for the Working groups to have a more tangible presence at the annual |

| | |
|---|---|
| <u>Question 1.5:</u> Can you suggest any improvements that would facilitate the vertical communications from/to the CEOS Chair and SIT to/from those at the most basic working levels (Subgroups, SBA task teams)? | |
| | <p>Plenary meeting. Tangible in terms of time allotted. Secondly, continued representation from SIT and CEOS Executive membership at the Working Group meetings to allow better two-way understanding of what is needed by, and what may be possible from, the Working group.</p> <ul style="list-style-type: none"> • Communication channels operate pretty well at present though any additional channels would be welcome. For example having members of the SEO have helped to gain insight into the other activities and plans across CEOS. I also appreciate the opportunity to attend the SIT meetings to see firsthand the issues and opportunities within CEOS. • More time and involvement with the Executive officers to realistically and effectively represent the advances made within the group, particularly with those topics that never see the light of day at the annual Plenary • In my view, the vertical communication is satisfactory. • The first step, I believe, is internal communications within each agency (between WG participants and SIT/Plenary participants). |
| Respondent 2 | We're going to have to do a lot more 'virtual' meetings etc. to coordinate. Many folks doing the work now are very busy doing multiple things. |
| Respondent 3 | I have the feeling that there are too many mechanisms (Working Groups, Sub-Groups, SBA teams, Constellation teams etc) within CEOS which means that communications, both vertical and horizontal, presents a challenge that is probably beyond the means of a "best efforts" organisation such as CEOS. |
| Respondent 4 | The only possible way is to improve the indirect communication on each website involved, with more clear, enhanced and updated contents. |
| Respondent 5 | I think SEC representation of WG Chairs is useful and important. New thematic structure proposed for Plenary 2011 is positive to address cross cutting issue (across WGs-SBA-VCs) – climate is one of the proposed themes. |
| Respondent 6 | When the SBA teams were organized, there was a lot of enthusiasm. I lobbied for SBA leads to give presentations at SIT meetings and Mary Kicza did make room for us at the Tokyo SIT meeting on Odaiba Island. But, I suspect that that took a lot of time in an already crammed SIT schedule, so that process wasn't repeated. There haven't been general SBA presentations since then, so it's unclear how SBA fit into the current SIT structure. An obvious issue is that we're mirroring the GEO SBA CoPs. Is this really the best approach? I chose to leverage an already existing community. I |

| | |
|--|---|
| Question 1.5: Can you suggest any improvements that would facilitate the vertical communications from/to the CEOS Chair and SIT to/from those at the most basic working levels (Subgroups, SBA task teams)? | |
| | <p>suspect that other SBAs are doing similarly, since there are only a limited number of enthusiastic volunteers. The key issue (to me) is whether CEOS-specific SBA teams are necessary? Given the experiment over the last few years, I'm not convinced that this is the case.</p> |
| Respondent 7 | <p>I think that the mechanisms are not bad, and SIT seems to me to be much more pro-active at monitoring and reporting on tasks and activities. I guess it would help if there were value judgments made by SIT on activities, plans and successes. Are the tasks what they want to see? Do they think the achievements are beneficial? Would they prefer other priorities? This feedback both direct to those carrying out tasks but also to their supporting agencies would be beneficial. Perhaps tasks, progress and actions could be made visible on a website?</p> <p>Formal Recommendations are reported back when endorsed but then seem to get lost and no clarity on whether anyone takes any action based upon them. A visible list of endorsed recommendations published would be useful with an appropriate identifier. Also perhaps, where appropriate, to have a requirement on agencies to report on progress towards implementing recommendations would raise their profile and value.</p> |
| Respondent 8 | I don't think I am qualified to answer this question. |
| Respondent 9 | There needs to be a small group copied on everything. Have these people in the loop. |
| Respondent 10 | <p>2 ideas:</p> <ul style="list-style-type: none"> - to have a newsletter for each SBA or working group, for internal and external information about "what we do, where we are and where we go", - to organize side events for SBA and working groups at each SIT and CEOS meeting |
| Respondent 11 | Communication channels operate pretty well at present though any additional channels would be welcome. For example having members of the SEO have helped to gain insight into the other activities and plans across CEOS. I also appreciate the opportunity to attend the SIT meetings to see firsthand the issues and opportunities within CEOS. |
| Respondent 12 (also see interview) | The SIT meetings and task workshops should focus on such communication and the agendas should be designed to let the CEOS leadership convey their observations and priorities, let the task teams report on progress and concerns...and, to allow time to address any issues. The SIT can follow up with WGs, SBAs and selected task teams via telecons. |
| Respondent 13 | <p>Yes.</p> <p>At the moment I think the flow of information both ways is inadequate and could be improved upon greatly.</p> |

| | |
|--|--|
| <p><u>Question 1.5:</u> Can you suggest any improvements that would facilitate the vertical communications from/to the CEOS Chair and SIT to/from those at the most basic working levels (Subgroups, SBA task teams)?</p> | <p>Being at the “lower” tier of CEOS (i.e. representing a sub-group and its members), it seems as though CEOS is top heavy – i.e. a lot of information is shared at the top levels yet it does not filter down to the sub-group levels. We are often informed after the fact or by chance at meetings. Often those at higher levels are unresponsive to emails (this could be that they are either busy or unaware of how things are working as well!). In addition, those put in charge of leading the development of documents etc are extremely busy and thus the process is far slower and less organized that it could/should be.</p> <p>More transparency in process, leadership, goals, how those goals are being achieved, timeframes etc etc. is required.</p> <p>Case specifically: I have become involved with the CEOS response to the GCOS IP because a lot of the actions pertain to validation of various satellite products and the necessity for observation networks and ground measurements. Some community members say it is an important, strategic document, while others say it is not and probably won’t be read after it is written (I’m astonished by this wide range of opinions). There seem to be various versions of this document (and similar documents!) floating around and there have been several calls for comments sent via wider mailing lists. There is no process for how this document will be handled, how comments will be accepted, rejected, treated in general (tracking who has provided those comments and on which version) etc etc.</p> <p>I have not been able to determine who wrote the initial GCOS document and actions within it. Nor have I been able to gauge how it is being managed or to what level the CEOS response to it is important to space agencies. In short, this whole process needs to be revised, else it is just a waste of time to anyone who contributes, In the case of LPV, several iterations of comments have all been ignored.</p> |
| <p>Respondent 14</p> | <p>Working Group has already defined their mandate as their “ToR”. The SBA Coordinator’s role (not “SBA task teams”) has not been defined clearly yet. Therefore, the most basic working levels for SBA Coordinator would be vary in each SBA. Climate SBA Coordinator would be most visible as coordinating the “CEOS response to GCOS Implementation Plan” in every year. For Water SBA, it is still in planning phase what CEOS can do for GEO Water Tasks. Given the small resource and variety situation of SBA coordinator, SBA coordinator should have some flexibility process and make periodic report to CEOS Sec and Chair level.</p> |
| <p>Respondent 15</p> | <p>I think that the communication between Chair / SIT and WGs/ VCs is OK. The SBAs are not very effective except some exceptions like Disaster</p> |

| <u>Question 1.5:</u> Can you suggest any improvements that would facilitate the vertical communications from/to the CEOS Chair and SIT to/from those at the most basic working levels (Subgroups, SBA task teams)? | |
|---|--|
| Respondent 16 | A: SBA team should report at SIT meetings and take actions. |
| Respondent 17[†] | The process is available via SIT etc... but we need more involvement and feedback. Need formal recommendation and comments/actions from stakeholders and agencies. Need more WG discussion with CEOS stakeholder level ... above technical staff. |
| Respondent 18 | <ul style="list-style-type: none"> A. Get institutes to allow the representatives to devote more time; B. Provide SBA's resources (e.g., student support, staff support, budgets for computing, travel etc); C. Define the SBA role's solidly; D. Give SBA's funding to fund projects within their SBA's |
| Respondent 19 | Perhaps a "what we do and need" presentation (video), no emails or documents |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

Questions 2. CEOS Structure, Governance, and Reporting

| <u>Question 2.1: Are the roles, responsibilities, goals, and objectives of CEOS Working Groups and SBAs clearly defined?</u> | |
|---|---|
| Respondent 1[†] | <p>The answer for WGISS is yes. WGISS has an established 5-Year Plan that includes this information. Not fully aware of the particulars for other groups, especially the SBAs</p> <p>Your inputs</p> <ul style="list-style-type: none"> • The Working Group I align to has an established 5-Year Plan that includes this information. • Yes I believe so. The formal procedures in place within WGISS and CEOS help to ensure that work is accomplished and responsibilities of members is clear. The objectives of the WG do change and reflect current and future needs. • WGISS wise, yes. Not fully aware of the particulars for other groups • Yes • For WGs – yes. Don't know much about SBAs |
| Respondent 2 | <p>The SBA climate is very focused on responding to the GCOS implementation plan and that seems to be the sole function of that SBA. WGClimate is a bit broader and does set goals separately. These two will likely merge down the road. We've tentatively agree to do merge following the latest GCOS response.</p> |
| Respondent 3 | <p>In general, I have the feeling that, on an individual basis, these are clearly defined but there are overlaps between the various entities which can be a cause of confusion (e.g. WGClimate, Climate SBA Coordinator, etc)</p> |
| Respondent 4 | <p>No, in general, because responsibilities, goals, and objectives are too broad and require focused scopes. Rethinking the CEOS Work Plan would force WGs and SBAs to establish more concrete goals.</p> |
| Respondent 5 | <p>WGs yes, I sometimes have my doubts about some of the SBAs (Climate excluded)</p> |
| Respondent 6 | <p>See answer to 1.5 above. I don't believe that the roles of the individual SBA teams are well defined.</p> |
| Respondent 7 | <p>Yes I think so (at least for the ones I am familiar with) Responsibilities perhaps implies a little more authority than I think is true. It is perhaps not always clear as to the distinction of some of the activities carried out in VCs and those seemingly the responsibility of WGs and why greater linkage is not always sought.</p> |
| Respondent 8 | <p>I think so.</p> |

| <u>Question 2.1: Are the roles, responsibilities, goals, and objectives of CEOS Working Groups and SBAs clearly defined?</u> | |
|---|---|
| Respondent 9 | It was defined in the charter of the group, but it was not used in the day to day activities. The WG worked on its own momentum/activities. |
| Respondent 10 | In my opinion, yes; but they could be accessible on the CEOS website...I am not sure they are yet. |
| Respondent 11 | Yes I believe so. The formal procedures in place within WGISS and CEOS help to ensure that work is accomplished and responsibilities of members is clear. The objectives of the WG do change and reflect current and future needs. |
| Respondent 12 (also see interview) | My experience is primarily with WGISS but in that case I think there is a clear statement of its role, responsibilities, goals and objectives. |
| Respondent 13 | Not to the level that they should be. I didn't even know SBA's existed until a few months ago and I am still unaware of their specific purpose and goals. The unfortunate situation of no dedicated CEOS funding really makes achieving the goals of the working/sub-groups quite difficult. |
| Respondent 14 | Not for SBA Coordinator |
| Respondent 15 | Yes for the WGs. For the SBAs, it could be improved |
| Respondent 16 | A: Not for the SBAs Teams |
| Respondent 17[†] | Working Groups goals and objectives are well defined. SBAs are not. Much of the VC work is overlapping the WGs and we need to coordinate. |
| Respondent 18 | The position description ought to be like job descriptions. The positions must have clear time allocations, resource allocations, and clear mandate. The SBAs should also be evaluated for their performance and delivery. |
| Respondent 19 | No, but it might be due to my status of SBA coordinator beginner |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 2.2: How much autonomy do Working Groups and SBAs have to set their scope and activities?</u> | |
|--|--|
| Respondent 1[†] | A reasonable amount. The Working group's plans are typically guided by awareness of CEOS goals and needs and WGISS main objectives. The details, however, of approach and implementation strategies is normally left to the group. |

| <u>Question 2.2: How much autonomy do Working Groups and SBAs have to set their scope and activities?</u> | |
|--|---|
| | <p>Your inputs</p> <ul style="list-style-type: none"> • A reasonable amount. • For WGISS There is substantial autonomy, though plans are always guided by awareness of larger CEOS goals. The details, however, of approach and implementation strategies is largely left to the group. Greater inter-WG communication will only strengthen the outcome of activities undertaken • Appropriate amount. • Full • The WG do have sufficient autonomy to decide their activities |
| Respondent 2 | WGClimate is fairly autonomous. Again SBA climate is very narrowly focused on GCOS implementation response. |
| Respondent 3 | I think this depends on the degree of freedom encapsulated in the initial ToRs agreed by Plenary and SIT for the particular WG or SBA. |
| Respondent 4 | There is enough autonomy to set their scope and activities. |
| Respondent 5 | WGClimate ToR, was a consensus decision across CEOS agencies... but initial activities/priorities defined within WG. I have no concerns on this at present. |
| Respondent 6 | They have considerable autonomy. And, success depends on the enthusiasm of the SBA coordinator and how engaged his/her CoP happens to be. |
| Respondent 7 | I believe that in the case of WGCV this is certainly adequate, although if the resources are not matching and thus goals consistent with those of CEOS SIT and plenary then it cant deliver. |
| Respondent 8 | I don't think I am in a position to accurately answer this question. |
| Respondent 9 | WGEdu had full autonomy. |
| Respondent 10 | In my opinion, we have quite a large autonomy; few requirements are needed (to gather several contributors, to identify contribution, planning and workplan) and are "basic" for any project management. |
| Respondent 11 | For WGISS There is substantial autonomy, though plans are always guided by awareness of larger CEOS goals. The details, however, of approach and implementation strategies is largely left to the group. Greater inter-WG communication will only strengthen the outcome of activities undertaken. |
| Respondent 12 | Since Working Groups were established to bring specialized experience to address the goals and objectives of CEOS at |

| <u>Question 2.2: How much autonomy do Working Groups and SBAs have to set their scope and activities?</u> | |
|--|---|
| (also see interview) | large, they are not nor should be autonomous but rather should be responsive to those needs. However, as experts they do have considerable latitude in how they organize and perform their activities. |
| Respondent 13 | Not sure, for reason mentioned in 2.1. |
| Respondent 14 | Depends on the work style, in case of already CEOS planning and implementing phase, CEOS internal management should be enforced. in case of investigating the requirement from outside, flexibility at each Working Groups and SBAs should be remained. |
| Respondent 15 | They have in theory a lot of autonomy once they accomplish the work requested by Plenary. The issue is that with the current level of resources, it is difficult to do extras. In practice, we have several examples of activities that are not directly related to a GEO task (main CEOS focus). |
| Respondent 16 | A: Sufficiently to propose action and to carry on execution and deliverable. |
| Respondent 17[†] | WGCV is autonomous. However, CEOS SIT and plenary need to support and provide, or recommend prioritization due to limited resource. |
| Respondent 18 | Since their job description and time allocations are limited, the autonomy is quite fluid and unclear. |
| Respondent 19 | So far lot of autonomy |
| [†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses. | |

| <u>Question 2.3: Are there shared expectations among CEOS leaders (including WG and SBA team Leads) regarding actions, deliverables, and outcomes?</u> | |
|---|--|
| Respondent 1[†] | <p>In general, yes. Occasionally, the Working Group level may not fully comprehend the desires from the Plenary level. At each CEOS Plenary meeting, almost no response to Working Group reports. Many of CEOS Plenary attendees do not even try to listen to the report</p> <p>Your inputs</p> <ul style="list-style-type: none"> • In general, yes. Occasionally, the Working Group level may not fully comprehend the desires from the Plenary level. |

| <u>Question 2.3: Are there shared expectations among CEOS leaders (including WG and SBA team Leads) regarding actions, deliverables, and outcomes?</u> | |
|---|---|
| | <ul style="list-style-type: none"> • Yes it appears to be true. I will defer to the WGISS chair to provide an overall WG response. Absolutely. It has become evident through the amount of work put in the action tracker and the role of the Executive officers shepherding the process. • Yes • In my view, yes. Results tend to be resource limited. • I don't think so. Expectations from CEOS Plenary/SIT leaders are very unclear. At each CEOS Plenary meeting, almost no response to WGISS report. Many of CEOS Plenary attendees do not even try to listen to the WGISS report, instead, they are focusing on their e-mail or something. |
| Respondent 2 | Yes, WGClimate and SBA climate have agreed to a shared strategy for the GCOS implementation plan response. |
| Respondent 3 | For the reasons given in 1.5, I am not sure that this is the case. |
| Respondent 4 | Only when higher level decisions are taken either at the SIT or the CEOS plenaries. The SEC telecons also help bring some expectations to a common ground. |
| Respondent 5 | Hope so |
| Respondent 6 | Unclear. The whole SBA structure seems to have stagnated in the past year or so. Some of the groups (e.g., Disasters) do have clear goals and are well supported by agencies for obvious reasons. But, it's not clear to me that nine distinct CEOS SBA teams, mirroring their GEO counterparts makes a lot of sense. |
| Respondent 7 | I believe that within individual WGs this is generally true. How much this interaction goes between WGs and SBAs is a different question. WGCV and WGISS have made progress towards common goals and objectives but not necessarily sure this is true with others. |
| Respondent 8 | I don't think I am in a position to accurately answer this question. |
| Respondent 9 | There is an understood value in CEOS communication. There was good communication from the CEOS Chair to WGEdu. WGEdu was aware of CEOS priorities. |
| Respondent 10 | As SBA coordinator for Health, I would like to have the feedback of the other contributors to the Health tasks. Gaps I have identified in my action are: - to have "high level" actions on EO contribution to health rather than a "project oriented" approach. This should enlarge |

| <u>Question 2.3: Are there shared expectations among CEOS leaders (including WG and SBA team Leads) regarding actions, deliverables, and outcomes?</u> | |
|---|--|
| | the number of potential contributors, and lead to be more on line with CEOS “requirements” on experience sharing and common practices. - to strengthen communication between the SBA Health contributors, and to have SBA health meeting on a more regular basis |
| Respondent 11 | Yes it appears to be true. I will defer to the WGISS chair to provide an overall WG response. |
| Respondent 12 (also see interview) | Much more so than in the past. GEO has had a positive influence on WGs and in the formation of SBAs in identifying and promoting SBA-focused tasks and cross-cutting tasks. |
| Respondent 13 | Uncertain. |
| Respondent 14 | Not yet. There would be variety range of expectations among CEOS leaders to the WG and SBA actions, deliverables and outcomes. The situation might be a problem. SIT would need to discuss about the shared vision on each CEOS activity. |
| Respondent 15 | Yes. CEOS leaders expect WGs, .. to support CEOS responses to specific GEO Tasks. |
| Respondent 16 | A: Yes |
| Respondent 17[†] | Okay in WGs. SBA communication lacking/non-existent. Need input from CEOS plenary and SIT level!! |
| Respondent 18 | SBA’s will have to go with begging bowl requesting people to contribute and since it is volunteer activity, some do contribute, others don’t and some do in bits and pieces. So, even if there are expectations, they are typically of limited nature. For example, there are CEOS space agencies who do not even attend the important meetings and think of the CEOS activities as after thought. |
| Respondent 19 | Partly, but more would be welcome |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 2.4: How is progress measured and documented?</u> | |
|--|---|
| Respondent 1[†] | Working group tasks follow a Task Plan. The progress measurement process is well established for WGISS. Tasks are routinely reported on by activity leads at each WGISS meeting as well as a series of telecons held in between these |

| <u>Question 2.4: How is progress measured and documented?</u> | |
|--|--|
| | meetings. Work plans all have schedules and deliverables. Success is often measured by acceptance and agreement with CEOS leadership and hopefully the adoption of WGISS recommended technologies, practices or other related WGISS products. All work is captured in meeting notes and reports and on the Working group website |
| Respondent 2 | We have a short term work plan with deliverables. To some extent, this plan has been overtaken by events like the Climate Architecture document and so that exercise has emerged as the first major effort of the WGClimate. That document will set the stage for the next steps. |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | Currently only the CEOS – GEO actions have been a way of measuring the deliverables. |
| Respondent 5 | N/A yet |
| Respondent 6 | Initially, through participation in GEO WP tasks. In the first year of activity, I had perhaps five GEO WP tasks specific to energy. |
| Respondent 7 | Via reporting at meetings and also in the interim periods by email and/or telecom via secretariat |
| Respondent 8 | I think it should be measured in terms of published results. |
| Respondent 9 | There were reports at the Plenary and at SIT. There was also some reporting at GEO Capacity Building Committee meetings and the CEOS Sec. |
| Respondent 10 | CEOS actions list is updated when needed, and documents are provided to CEOS SEO. The possibility to access to CEOS documents on line through CEOS website would be appreciated in easing access to CEOS SBA and Working Groups progress |
| Respondent 11 | This process is well established for WGISS. Tasks are routinely reported on by activity leads at each WGISS meeting as well as a series of telecons held in between these meetings. Work plans all have schedules and deliverables. Success is often measured by acceptance and agreement with CEOS leadership and hopefully the adoption of WGISS recommended technologies, practices or other related WGISS products. All work is captured in meeting notes and reports. |
| Respondent 12 (also see interview) | GEO task reports and reports at CEOS Plenary, SIT and WG meetings and at GEO Committee meetings. |
| Respondent 13 | Again, uncertain. Sub-groups just provide a status report at meetings. But there are only broadly outlined expectations, specific goals are not set nor monitored for outcome/achievement, simply because most of the desired activities are not |

| <u>Question 2.4: How is progress measured and documented?</u> | |
|--|--|
| | funded or only loosely funded. Input is basically on an in-kind basis by those who are already overcommitted. |
| Respondent 14 | CEOS Plenary report and its presentations |
| Respondent 15 | If it is a CEOS GEO action, the list of milestones and deliverables is defined at the beginning of each year. Progress are measured against this initial list. The progresses on other activities are less visible. |
| Respondent 16 | A: Through the tracking of progress on actions. |
| Respondent 17[†] | WG and SG meetings and also in the interim periods by email and/or telecom via secretariat |
| Respondent 18 | There are procedures of progress assessment. But the tasks assigned are often without funding and so little gets accomplished. What is accomplished is through courtesy of someone who has put some volunteer time and it is often half boiled. CEOS should focus on greater substantial activities like GEO G20 GLAM initiative leading to setting up of an operational global agricultural monitoring system of systems. |
| Respondent 19 | Since my start 4 month ago only via short email or telephone call reports |
| [†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses. | |

| <u>Question 2.5: How does communication flow among Working Groups, SBAs, and CEOS leadership bodies?</u> | |
|---|--|
| Respondent 1[†] | Generally, through the Working Group leadership roles or assigned points-of-contact. Personal contacts between those in different groups could also help in several occasions. |
| Respondent 2 | We have discussed with Climate SBA that he would complete the current task of collating a CEOS response to the 2010 GCOS Implementation plan. That response would be vetted through WGClimat and, following that, the Climate SBA duties would be folded in to WGClimat. |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | Please refer to answer at 2.3. |
| Respondent 5 | SEC telecons useful, reporting opportunities at previous SITs ok at Plenary inadequate – I am hoping the new Plenary structure will address this. |
| Respondent 6 | Not well. Again, SBA seem to be the forgotten step-child particularly in communication with leadership bodies. |
| Respondent 7 | My view is that most appears to happen at formal SIT or plenary meetings but is relatively ad-hoc other than relatively |

| Question 2.5: How does communication flow among Working Groups, SBAs, and CEOS leadership bodies? | |
|--|---|
| | well-defined links with WGCV and WGISS. It is assumed that a similar relationship will develop with WG-Climate. Individuals are given liaison roles with VCs but this again is fairly ad-hoc in terms of reporting and interfacing. |
| Respondent 8 | I don't think I am in a position to accurately answer this question. |
| Respondent 9 | |
| Respondent 10 | Email is very convenient |
| Respondent 11 | The mechanics of these communication are done through our WGISS leadership structure. Primarily the WGISS chair acts on our behalf in CEOS leadership meetings and represents our WG goals and activities. Also the chair provides feedback to the WG and alerts us to goals and priorities. A firmer connection between those in the SBAs and the WGs could be made. |
| Respondent 12 (also see interview) | In addition to meetings and telecons as mentioned, the task monitoring/reporting by the CEO is also a productive mechanism for communication. |
| Respondent 13 | Uncertain. |
| Respondent 14 | Currently, CEOS Sec telecon, and SIT and Plenary meetings as request based |
| Respondent 15 | Seems OK vertically overall; seems OK horizontally between WGISS and WGCV; inexistant horizontally in other cases. |
| Respondent 16 | A: Mostly through the CEO |
| Respondent 17[†] | Some of this happens at SIT or plenary meetings but need more discussion with leadership bodies. Need better defined com plan with VCs. Even though we have recently established WGCV pocs for the VCs. SBAs? Don't know of contact or meeting. WGCV and WGISS connect and we should have reps attend each WGISS and WGEdu and WGClimate meeting of allow access via web ex. There should be at least a joint presentation/discussion at every meeting of the each of the VC/WGs discussing common needs and needs across VCs for the WGs and visa versa |
| Respondent 18 | CEOS meetings and specialized meetings |
| Respondent 19 | – do not know |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

Questions 3. Effect of Addition of WGClimate, Virtual Constellations, Societal Benefit Areas to CEOS Structure

| <u>Question 3.1: Are there key ways in which the functions and activities of the Working Groups and SBAs should be improved or modified?</u> | |
|---|--|
| Respondent 1[†] | <p>Additional challenge for CEOS participants to support in terms of work products as well as the added costs of travel. That is not to say that these are not needed or important.</p> <ul style="list-style-type: none"> • Possibly more clarification of how the Working Groups can provide direct contributions. • Improve overall communications and information sharing, for example holding a joint meeting among groups • Attendance at meetings would strengthen awareness • Co-ordinated support within Agencies to ensure sufficient resources are made available to support all activities • Showcases and other events to highlight achievements |
| Respondent 2 | Per answer to question 2.5 we're looking at merging the Climate SBA into the WGClimate |
| Respondent 3 | It is suggested that there is a rationalization/minimisation of the number of CEOS mechanisms to streamline the work of CEOS and focus better on the key deliverables - see also response to 1.5. |
| Respondent 4 | Rethinking the CEOS Work Plan. |
| Respondent 5 | WGs ok |
| Respondent 6 | See discussion above. I remain unconvinced that all GEO SBA areas require a CEOS counterpart. Those that are still active should certainly not be disbanded. I'd like to see more effort at the GEO Secretariat level to maintain and reinvigorate the respective SBA CoPs. |
| Respondent 7 | I am not completely sure I fully understand the benefit of the VCs and SBAs. The latter I assume are nominal contact points to CEOS but they don't seem to interact very much with the WGs (except the climate SBA). I would have expected that they would be providing requirements from GEO to WGs and informing GEO on capabilities of WGs. It seems that lots of structures like VCs although in some ways a focus, detracts effort and resource from potentially generic activities, and can lead to overlaps of effort. It is assumed that WGClimate will be the focus to provide requirements on to the WGs and should be a clear driver of priorities. It is essential that a close dialogue and interface between it and at least WGCV is |

| <p><u>Question 3.1: Are there key ways in which the functions and activities of the Working Groups and SBAs should be improved or modified?</u></p> | |
|--|--|
| | <p>established.</p> <p>I believe that the biggest gain would come from some “common Pot” of resource to be administered by WGCV chair or SIT chair prioritized by WGCV to enable rapid progress to be made on key actions of benefit to CEOS agencies. Perhaps initiated by a small subscription payment from agencies. This would reap major rewards even if the contribution per agency was small a few \$10sk per annum (equally paid or by some GDP or other scaling factor) as a pilot starting point I believe the communal benefit that would accrue would soon lead to increases and a real ability to achieve a global rewards possible from CEOS with prospect of shared infrastructure established and operated to meet long-term needs and not subject to national/project specific short-term goals.</p> <p>Also greater encouragement from all agencies to support the activities of the WGs, the above would also facilitate this as there would be renewed incentive to influence resources.</p> |
| <p>Respondent 8</p> | <p>I don't think I am in a position to accurately answer this question.</p> |
| <p>Respondent 9</p> | <p>With so many entities, it was hard to follow who had jurisdiction over what. There are more entities being added, but the old and less relevant are not being eliminated. There appears to be a certain amount of mission creep, especially with the growth of the constellations.</p> <p>CEOS Secretariat teleconferences were usually long and filled with action updates.</p> |
| <p>Respondent 10</p> | <p>Addressing SBA Health, as the domain is quite new for space agencies, other CEOS Working groups and CEOS partners, high level actions about the contribution of EO to health must be encouraged, rather than specific project. These new approach should ease crosscutting between Health and other CEOS major development like Virtual Constellation. SBA Health should take benefit of new GEO Workplan 2012-2015 to erase previous CEOS Health actions and propose new CEOS Health actions more on line with the “philosophy” of high level actions about the contribution of EO addressing new GEO Health Tasks.</p> |
| <p>Respondent 11</p> | <ul style="list-style-type: none"> - Improve overall communications and information sharing - attendance at meetings would strengthen awareness |

| <u>Question 3.1: Are there key ways in which the functions and activities of the Working Groups and SBAs should be improved or modified?</u> | |
|---|--|
| | <ul style="list-style-type: none"> - additional resources for WG activities - showcases and other events to highlight achievements |
| Respondent 12 (also see interview) | Maybe one way that the relevance and responsiveness of each WG task or activity would be to ensure that it has an SBA or VC endorsement. This would also foster and promote intergroup communication. |
| Respondent 13 | Uncertain for reasons pertaining to above answers. |
| Respondent 14 | More frequent communications with CEOS leads (Chair, SIT, CEO) in order to recognize the whole CEOS community on what is going on each WG and SBA. |
| Respondent 15 | Vcs should be less independent and more focus on specific CEOS-level priorities like the response to GCOS. SBAs are in general not performing well: ToR shall be defined and SBAs Leads reconfirmed to ensure a minimum of motivation |
| Respondent 16 | A: The use of the SBA teams by the CEO could be better defined though that so far the CEOs have been very helpful. SBA teams should report. |
| Respondent 17[†] | <p>I do not know the CEOS role of the VCs and why we did not incorporate or include the efforts via WGs or enhance our current structure to accommodate. WGCV does not understand SBAs interaction. During the first WGClimate meeting there was clear cross wg needs between WGCV and WG Climate, we need to continue working this relationship.</p> <p>Better infrastructure control and communication! Support from all agencies!</p> |
| Respondent 18 | <p>These additions is where CEOS can show relevance. For example, contributing to the 9 SBA's. Climate and agricultural SBA initiatives, virtual constellations, and working groups are a must. Virtual constellation for example is making progress, but real data should be made available through virtual constellations for anyone in the world to use.</p> <p>Yes. A. Clearly define one's role; B. Allocate time and resources to fulfill the role; C. Evaluate and award performance.</p> |

| <u>Question 3.1: Are there key ways in which the functions and activities of the Working Groups and SBAs should be improved or modified?</u> | |
|---|--|
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 3.2: Should Working Groups and SBA Teams be reorganized and/or consolidated?</u> | |
|---|---|
| Respondent 1[†] | A review of the relationships between the components would be worthwhile to optimize the structure but we do not see an immediate need for reorganization. It would depend on whether the Plenary, and its associated membership, is receiving the work products it requires in a timely fashion. |
| Respondent 2 | Per answer to question 2.5 we're looking at merging the Climate SBA into the WGClimate |
| Respondent 3 | See response to 3.1. |
| Respondent 4 | No, except for WGEdu, which is under reorganization. |
| Respondent 5 | WGClimate fine as it is. We do not plan to establish any sub-group in the near-term. |
| Respondent 6 | Yes, see above. |
| Respondent 7 | WGs are probably right (not sure about SBAs and VCs) |
| Respondent 8 | I don't think I am in a position to accurately answer this question. |
| Respondent 9 | CEOS cannot be a clearinghouse. There needs to be a greater focus on what exactly CEOS wants to accomplish. Then form the WG based on this goal. |
| Respondent 10 | As CEOS members are contributing on a voluntary basis, it seems difficult to have strong directives about SBA Health organization. Good will and motivation are essential. I am open to any proposition. |
| Respondent 11 | This should be explored but I do not see an immediate need for reorganization. |
| Respondent 12 (also see interview) | With the proliferation of groups and limited resources, this probably should be considered. As one example, I'm not familiar with the WGClimate but would question its relationship to the Climate SBA. |
| Respondent 13 | No. Working groups and their sub-groups are important in their own right. |
| Respondent 14 | Depends on WGs and SBA. For Water SBA, it is small team just only JAXA (Osamu Ochiai) and the support contractor |

| <u>Question 3.2: Should Working Groups and SBA Teams be reorganized and/or consolidated?</u> | |
|---|--|
| | (Rick Lawford). Water SBA is mainly focus on currently to the GEO Water Tasks support lead by Prof. Toshio Koike, Univ. of Tokyo. |
| Respondent 15 | Yes for the SBAs (see above) |
| Respondent 16 | A: May be. Must take in consideration the structure of GEO and how we report to the GEO secretariat. |
| Respondent 17[†] | WGs are right and have been for years, the new stuff VCs and SBAs are cause focus but are also very confusing. VCs maybe should feed appropriate working groups. |
| Respondent 18 | Recognized for sure. |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 3.3: How active is your CEOS SBA? (for all SBA leads)</u> | |
|--|---|
| Respondent 1[†] | N/A. However the WGISS is very active. |
| Respondent 2 | N/A – Mitch Goldberg is current Climate SBA and has been very active in generating COES response to GCOS implementation plans |
| Respondent 3 | See response to 3.1. |
| Respondent 4 | Does not apply to INPE. |
| Respondent 5 | N/A |
| Respondent 6 | In the past year, relatively inactive. There are still GEO WP tasks for energy, but this SBA has always been a difficult one to get established. We’ve had some success (see attached paper for some details), but it’s difficult to sustain these activities with episodic agency funding. |
| Respondent 7 | |
| Respondent 8 | N/A. |
| Respondent 9 | |
| Respondent 10 | Level of activity is low, to my opinion, due to a “project oriented” approach. This approach limits the contribution of “non project supportive” partners (today, only NOAA and CNES are really active) and limits links with other CEOS SBA and |

| <u>Question 3.3: How active is your CEOS SBA? (for all SBA leads)</u> | |
|--|--|
| | working groups. |
| Respondent 11 | I will defer this query to our WGISS chair. |
| Respondent 12 (also see interview) | N/A |
| Respondent 13 | n/a |
| Respondent 14 | Active interface with GEO Water Task activity but weak interface with CEOS inside as GEO Water requirement to CEOS is still uncertain and need to be clear |
| Respondent 15 | Rather OK as most of the Transverse activities are performed by WGISS and WGCV |
| Respondent 16 | A: CSA, NASA and ESA members are the most active one. Activities in others agencies varies from support to no participation. |
| Respondent 17[†] | I know SBA leads in many cases but I have never been approached with what SBAs require. I don't know why? |
| Respondent 18 | As active as the time and resources allow. To ask for more (when he\she has full time job) is asking for the moon. |
| Respondent 19 | – I just started, hence not very active, but with a steep activity curve |
| [†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses. | |

| <u>Question 3.4: What are the impacts, overlaps, shared or complementary roles, objectives and needs of the VCs' activities on the work in your WG or SBA?</u> | |
|---|--|
| Respondent 1[†] | One area that probably is shared across all of the VCs is the need for a portal or clearinghouse from which data from the relevant VC can be made discoverable and shared. And that's why we are assigned to lead the Data Harmonization Tasks |
| Respondent 2 | There are obviously large overlaps with many of the VC's, however we need to survey the VC's in terms of their commitment and status of producing climate data records |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | It is clear how LSI impacts WGCV activities, but we can't identify the interactions among other VCs and WGs. |
| Respondent 5 | This is a key point for WGClimate. The VCs provide an important potential contribution to W |

| <u>Question 3.4: What are the impacts, overlaps, shared or complementary roles, objectives and needs of the VCs' activities on the work in your WG or SBA?</u> | |
|---|---|
| Respondent 6 | Relatively little synergy to date with the VCs and the energy SBA. I don't see an obvious linkage at present. |
| Respondent 7 | Often there appears to be activities carried out/scoped or planned in the VCs related to Cal/Val which should at least be done in coordination with WGCV to demonstrate a common voice and reporting line and also to ensure maximum benefit can be made with any resource. |
| Respondent 8 | N/A |
| Respondent 9 | WGEdu does not have a set functional area. All VC's have an inherent outreach role. For each VC, you can identify what are the underserved communities and then the WGEdu could address those. There were not many movers in the WGEdu to carry out this type of approach. |
| Respondent 10 | Virtual Constellation contribution is not integrated in SBA Health approach today; it should be. The feedback I have on SBA Health I lead for 2 years now, makes me think that the "approach" must be re-oriented to "high level" actions that could open the way to crosscutting between Health and others CEOS groups. |
| Respondent 11 | I believe there is a good deal of shared goals for the VCs and WGISS. The WG is very active in seeking ways to further enable these groups access and share data. We look forward seeking those technologies and systems that will help the VC concept operate. In addition I believe the needs of the VCs and WGISS are shared in the addition of greater capacities to move our work forward. |
| Respondent 12 (also see interview) | In the case of WGISS, I believe the needs of the VCs are and should be major drivers of WGISS activities. |
| Respondent 13 | Not sure. |
| Respondent 14 | Once GEO Water SBA's requirement will be clear, in order to fall them into CEOS action, each CEOS bodies - VC's and WG's roles should be coordinated. SBA Coordinator's role would be just coordination between GEO and CEOS for proper requirement flow not overwhelming the practical implementation. |
| Respondent 15 | VCs' contributions to WGs and SBAs are quite low (a bit more on the dvpt of portals) and shall be reassessed and reorientated |
| Respondent 16 | A: Chair of relevant VC and WG are on our distribution list and invited to either teleconference and meeting. However the relation of the disaster SBA team is probably more important with the Disaster Charter which is not a VC. |

| <u>Question 3.4: What are the impacts, overlaps, shared or complementary roles, objectives and needs of the VCs' activities on the work in your WG or SBA?</u> | |
|---|--|
| Respondent 17[†] | VCs activities related to Cal/Val which should at least be done in coordination with WGCV. |
| Respondent 18 | Overall is insignificant. Uniqueness clear. |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Question 3.5: In what ways does your WG (or SBA) cooperate, communicate, and interact with other WGs, SBAs, VCs, and the CEOS executive functions? What joint meetings have you held? Are there joint meetings or other sharing mechanisms you think could be helpful? Do you have joint products or products?</u> | |
|--|---|
| Respondent 1[†] | One very useful strategy embraced by WGISS and WGCV is to periodically have joint meetings with a portion of the agendas being shared with both of the Working groups coming together. This has been an important means of keeping abreast of each other's work. It would be interesting to set up additional joint meetings with different Working groups to see how they interact. Jointly holding occasional SBA, VC, and Working group meetings may also be useful. |
| Respondent 2 | WGClimate is not that far along with interactions. As mentioned above, we first want to fully understand where each VC is with respect to climate to as to maximize use of what already exists |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | I presume this has been answered. |
| Respondent 5 | Yes see above. |
| Respondent 6 | Minimal. I've tried to highlight the recent paper that I had published in Applied Energy with CEOS SIT leadership, but it was met with little interest. |
| Respondent 7 | WGCV has regular joint meetings with WGISS and some joint projects all of which have proven very useful. I think that the co-located meetings, particularly when the opportunity to interact socially is achieved are very fruitful and beneficial. Similarly we have had some joint sessions with VCs. These need to be more regular to have real benefit as they always |

| | |
|---|---|
| Question 3.5: In what ways does your WG (or SBA) cooperate, communicate, and interact with other WGs, SBAs, VCs, and the CEOS executive functions? What joint meetings have you held? Are there joint meetings or other sharing mechanisms you think could be helpful? Do you have joint products or products? | |
| | seem to go over old ground. |
| Respondent 8 | However, it is noted that more independent meetings is not the answer but more co-located. |
| Respondent 9 | I have attended joint WG meetings. This can help see the bigger picture. |
| Respondent 10 | The Eduflow project was a combined effort of NASA, INPE, CONAE. There were Data Democracy workshops that involved CMA, GISTDA, INPE, CNES. USGS held workshops with INPE, GISTDA help. |
| Respondent 11 | Nothing of the kind today... SBA Health is just 3 years old, we are still in a “construction” phase and we have to find the most convenient way of working. |
| Respondent 12 (also see interview) | The responses above cover much of this question. I do feel our joint WGISS WGCV meetings are very useful. More of these type of meetings held across the SBAs and VCs would also improve communication. It might be helpful if CEOS leadership could define goals and tasks where multiple WG and/or VC SBA inputs are needed. The issue of EO data quality is one example. |
| Respondent 13 | WGISS has periodic joint meetings with WGCV and at least one joint GEO task (Data Harmonization), also supports SBAs (e.g. IDN Climate Diagnostics Portal) and reports task status to CEO. Additional joint meetings, e-workshops and tasks would be helpful. |
| Respondent 14 | Joint WG meetings (WGCV/WGISS). No contact with VC, SBA or executive functions from my level. There could be more communication than there is currently. |
| Respondent 15 | For Water SBA Coordinator, it has not yet started such a level |
| Respondent 16 | Transverse group is special (and different from other CEOS SBA groups) as it relies largely on WGISS and WGCV. A: We try to support and attend meeting of relevant WGs and VCs whenever it is possible. Time is obviously missing for a good coverage. At sometime have joint actions. |
| Respondent 17[†] | Coordinated joint meetings are needed. Individual meetings need to be complemented. Joint WGCV/WGISS meetings every 2 years but need better regular communication – Hopefully WGISS will be better integrated to WGCV. |

| | |
|---|--|
| <p><u>Question 3.5:</u> In what ways does your WG (or SBA) cooperate, communicate, and interact with other WGs, SBAs, VCs, and the CEOS executive functions? What joint meetings have you held? Are there joint meetings or other sharing mechanisms you think could be helpful? Do you have joint products or products?</p> | |
| Respondent 18 | I have seen everyone doing their best within the known constraints of mandate and resources. |
| Respondent 19 | Joint meetings of SBA coordinators would be very helpful – rather an informal meeting to discuss ideas in person |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

Questions 4. External Organizations and GEO

| | |
|--|--|
| Question 4.1: Are you familiar with CEOS Rio Statement? (Note: It can be located here: http://www.ceos.org/images/General/14Oct2010-CEOS-RIO-Statement.pdf) | |
| Respondent 1[†] | Yes, I do. However, the statement may not fully be understood clearly by some WGISS members. The WGISS chair may need to find a better way convey message from the plenary to the working group members. |
| Respondent 2 | Yes, the WGClimate arose in response to this statement. We have incorporated this language into the CEOS WGClimate term's of reference |
| Respondent 3 | Yes |
| Respondent 4 | Yes, because INPE helped organize this document. |
| Respondent 5 | Yes – explicitly mentions formation of WGClimate |
| Respondent 6 | Yes. |
| Respondent 7 | Yes having read the above link |
| Respondent 8 | No. |
| Respondent 9 | Have read through it. |
| Respondent 10 | Yes, I am |
| Respondent 11 | Yes, aware but not fully knowledgeable. |
| Respondent 12 (also see interview) | Yes. |
| Respondent 13 | No, not until it was pointed out here! |
| Respondent 14 | Yes |
| Respondent 15 | yes (I was the main author as CEO !!) |
| Respondent 16 | A: Yes |
| Respondent 17[†] | Yes |
| Respondent 18 | Yes. |
| Respondent 19 | |

[†]Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| | |
|---|---|
| <u>Question 4.2: Do you think the relationship between CEOS and GEO is clear and well understood by your WG (or SBA)? As the ‘satellite arm’ of GEO, how is your WG (or SBA) contributing to the GEO System of Systems? In what ways does your WG (or SBA) communicate with GEO, i.e. through the CEOS SEC, Plenary, and SIT and also directly with GEO Tasks and crosscutting groups?</u> | |
| Respondent 1[†] | For some members, the relationship is clear. However, as GEO solidifies its role and presence around the different communities around the world, the relationship with our WG is becoming clearer. Our group communicates with GEO in almost every possible avenue. The idea of having Executive officers participating at WGs and subgroups enhances the relationship tremendously. |
| Respondent 2 | We haven’t worked through this all yet. We’re exploring a climate architecture that would focus on Climate and then also have appropriately organized metadata so that, at the higher GEO level, one could slice and dice what WGClimat is doing into the different GEO SBAs. We’re thinking that an enterprise architecture structure, and perhaps some of those tools, would best enable this. Right now, the ‘system of systems’ approach has not been enabled because the architecture components that sit below in the SBAs have not allowed a rich inventory with tags to search and analyze at the GEO level. We are examining how we might more fully populate the MIMS data base with some additional information to better enable this to happen. |
| Respondent 3 | Concerning the relationship between CEOS and GEO, I think this is clear. The remainder of the questions are not applicable to the role of Weather SBA Coordinator (for the reasons given in response to 1.1). |
| Respondent 4 | The relation is clear but not well understood. CEOS alone has its importance and should address its activities regardless of GEO. On the other hand, GEO actually establishes needs for EO satellite data and, therefore, poses a genuine demand on CEOS. The WGs have the willingness to contribute and work together with GEO. Communication is granted by tentatively having GEO representatives participating on CEOS meetings, telecons, and mailing lists. |
| Respondent 5 | Yes. Main contribution to GEO Climate SBA – implantation of GCOS. Offline comment: sometimes I feel that GEO does not take climate very seriously. |
| Respondent 6 | See discussion above. I am trying to work with Humbulani at GEO SEC to get energy activities moving again. |

| <p><u>Question 4.2: Do you think the relationship between CEOS and GEO is clear and well understood by your WG (or SBA)? As the ‘satellite arm’ of GEO, how is your WG (or SBA) contributing to the GEO System of Systems? In what ways does your WG (or SBA) communicate with GEO, i.e. through the CEOS SEC, Plenary, and SIT and also directly with GEO Tasks and crosscutting groups?</u></p> | |
|--|---|
| Respondent 7 | WGCV is well connected with GEO and formulates a lot of its work in the framework of GEO tasks. It reports through CEOS SEC and SIT to GEO and also has some interaction directly with other Geo tasks and cross-cutting themes such as data sharing. It struggles however to really hand over or at least fully engage with initiatives such as QA4EO. There always seems to be issues on ownership and interaction for cross-cutting themes and the ability for GEO and GEOSS to adopt and promote single best practises. |
| Respondent 8 | I don't think I am in a position to accurately answer this question. |
| Respondent 9 | Yes, many of the WGEdu members also served in GEO (mainly in the CBC). WGEdu and the CBC actually overlap a great deal and it might be useful to evaluate the necessity of having independent groups. The GEO WP tasks are taken on in CEOS. This sometimes leads to task creep, e.g. the GEO malaria task that was split into 3 tasks in CEOS. |
| Respondent 10 | My position of CEOS SBA Health coordinator and <u>GEO Health Community of Practice</u> “Health and Environment” co-leader is very convenient for harmonizing GEO Health Tasks and CEOS Health Actions, easing communication between to two groups during CEOS meetings, SIT and GEO CoP “Health and Environment” workshops. |
| Respondent 11 | I believe the overall organizational understanding could be improved. This would only help us all clarify the middle portion of the venn diagram where CEOS adjoins GEO. As stated WGISS communicate formally with GEO via the CEOS SEC. Often however there is communication through technology projects where WGISS members participate. The GEO technology pilots is one such forum. Moreover WGISS is often on the forefront of technology issues that confront the GEO vision of a global system of systems. CWIC is an example of a wholly CEOS approach to this issue. |
| Respondent 12 (also see interview) | I think WGISS has diligently worked to align its tasks and activities to support CEOS in serving as the satellite arm of GEO. Multiple representatives of WGISS have regularly participated in GEO's Architecture and Data Committee and have led or contributed to GEO tasks. |
| Respondent 13 | No. |
| Respondent 14 | CEOS Water SBA Coordinator has been fully and directly supporting to the GEO Water Tasks. In particular, Prof. Toshio Koike who is leading most of GEO Water Tasks willing to work with CEOS as satellite arm of GEO. Current problem |

| | |
|---|---|
| <u>Question 4.2: Do you think the relationship between CEOS and GEO is clear and well understood by your WG (or SBA)? As the ‘satellite arm’ of GEO, how is your WG (or SBA) contributing to the GEO System of Systems? In what ways does your WG (or SBA) communicate with GEO, i.e. through the CEOS SEC, Plenary, and SIT and also directly with GEO Tasks and crosscutting groups?</u> | |
| | would be less communicating with other CEOS bodies. It would be necessary to consolidate the CEOS Water Action from the GEO Water requirement in appropriate. |
| Respondent 15 | overall yes thanks to strong involvement of WGISS and WGCV in GEO |
| Respondent 16 | A: The relation s well understood. The CEOS disaster SBA team lead two GEO actions and contribute to others. Communication is done through the CEOS CEO and directly with the GEO secretary SBA coordinator. |
| Respondent 17[†] | WGCV is well connected with GEO and formulates a lot of its work in the framework of GEO tasks. It reports through CEOS SEC and SIT to GEO and also has some interaction directly with other Geo tasks and cross-cutting themes such as data sharing. It struggles however to really hand over or at least fully engage with initiatives such as QA4EO. There always seems to be issues on ownership and interaction for cross-cutting themes and the ability for GEO and GEOSS to adopt and promote single best practices. |
| Respondent 18 | Yes. |
| Respondent 19 | Communication via Ceos sec – partly through sit of e.g. GEO-BON |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| | |
|---|---|
| <u>Question 4.3: Please provide an exemplary product recently completed by your WG (or SBA).</u> | |
| Respondent 1[†] | <p>Naming just one may not be enough for our group. Several tangible deliverables which worth to mention here include:</p> <ul style="list-style-type: none"> • CWIC, The CEOS WGISS Integrated Catalog prototype and work plan for adding partners. • Web services and security paper • The seamless web search study and paper • Namibia Sensor Web Flood Demonstrator • The atmospheric composition support activity is a good example. • IDN • CEOS Water portal |

| <u>Question 4.3: Please provide an exemplary product recently completed by your WG (or SBA).</u> | |
|---|---|
| Respondent 2 | Draft of Climate Architecture plan and WGClimate Terms of Reference attached. |
| Respondent 3 | Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1 |
| Respondent 4 | CWIC (WGISS), QA4EO principles and guidelines (WGCV), Free and open-source ortho-rectification tool (LSI), EduFlow (WGEdu). |
| Respondent 5 | N/A – First product will be CEOS-CGMS-WMO Strategy for Climate monitoring architecture doc, due Q1 2012. |
| Respondent 6 | The USGS-led Solar and Wind Energy Resource Assessment (SWERA) activity (funded, in part, by NASA Applied Sciences) was a key success in advancing access to renewable energy resource assessment information in the developing world under the auspices of UNEP. It was highlighted at the GEO Plenary in Washington. See my paper, attached, for further details. |
| Respondent 7 | QA4EO is probably the best example and in association with that various international comparisons to identify biases and facilitate data harmonization. |
| Respondent 8 | I would point to the thermal infrared intercomparisons to support Sea Surface Temperature. |
| Respondent 9 | EDUFLOW |
| Respondent 10 | Recently product from SAB Health is a proposal for new CEOS Health tasks in response to new GEO Workplan Health Tasks. |
| Respondent 11 | <ul style="list-style-type: none"> - The CWIC prototype and work plan for adding partners. - Web services and security paper - The seamless web search study and paper - Development of an ISO 19115 implementation study - there is more, colleagues will offer |
| Respondent 12 (also see interview) | I think the IDN Climate Diagnostics Portal was an early example of WGISS support to GEO and I believe the satellite data discovery and access that will be provided by the CWIC implementation will have tremendous utility to numerous GEO task. |
| Respondent 13 | Cal/Val portal |
| Respondent 14 | The activities of invite CEOS members to African Water Cycle Coordination Initiative Workshop which will be held in Nigeria Abuja September 8-10 (On-going coordination to invite NASA, NOAA, ESA in personal) |
| Respondent 15 | QA4EO guidelines; CWIC; ... |

| Question 4.3: Please provide an exemplary product recently completed by your WG (or SBA). | |
|--|--|
| Respondent 16 | A: Caribbean Disaster Pilot 2011-12 workplan attached. |
| Respondent 17[†] | QA4EO is probably the best example and in association with that various international comparisons to identify biases and facilitate data harmonization. DA-09-01a. This is very important in CEOS and we need to work across WGs/VCs to implement common QA process for CEOS data and products. Metadata/format/uncertainty/quality flags/cal-val files/quality bit files/... if CEOS cares about common use of data and interoperability of GEOSS dataset from CEOS agencies; we need to engage in this area. Pay it now or pay it later. |
| Respondent 18 | Here is where the problem is. How can one expect “exemplary product” when resources are negligible. Whatever one does is on voluntary basis. Either WG or SBA does it or begs someone. Honestly, for “exemplary products” there ought to be “exemplary funding”. |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| Question 4.4: What external organizations do you work with? Please describe at what level (use standards of, provide or products to, liaison, etc.) | |
|--|---|
| Respondent 1[†] | <p><i>As WGISS, we work with</i></p> <ul style="list-style-type: none"> • OGC – exploit standards and provide feedback • UN – provide support – eg distribution of global Landsat and DEM data • CCSDS – use of recommendations e.g. OAIS data preservation. • ICSU CODATA – Co-Chair Data At Risk Task Group. |
| Respondent 2 | We are working with GCOS on ECV requirements satellite supplement update, WMO and CGMS on Climate Architecture, and WMO SCOPE-CM on operational climate data records. |
| Respondent 3 | <i>Not applicable to the role of Weather SBA Coordinator for the reasons given in response to 1.1</i> |
| Respondent 4 | INPE is currently engaged in cooperation with CAST and CRESDA (CBERS Program); with USGS (Landsat direct downlink to Brazil); with ISRO (ResourceSat direct downlink to Brazil); with JPL/NASA (Proposal for a Hyper Spectral satellite mission); with NOAA (GeoNetCast Americas, GOES repositioning to enhanced coverage over South America); with CONAE (Ocean Color satellite mission); with JAXA (use of ALOS-PALSAR data for forest monitoring); with INTA, NARSS, and SANSA (CBERS for Africa Initiative); with IRD (multi-lateral agreement with France and Gabon to |

| Question 4.4: What external organizations do you work with? Please describe at what level (use standards of, provide or products to, liaison, etc.) | |
|--|---|
| | set up a CBERS ground station in Libreville). |
| Respondent 5 | Initial external outreach is with GCOS, WCRP, WMO, CGMS Future IPCC |
| Respondent 6 | In the past, task leads have interacted with stakeholders at a number of agencies, including the International Energy Agency (IEA) relating to solar energy resource standardization, RETScreen (a part of Natural Resources Canada), ASHRAE and the American Institute of Architects for building efficiency improvement, and NREL. |
| Respondent 7 | I personally am at a National metrology institute and so in the context of EO work with space agencies such ESA and UKSA etc in provision of calibration and consultancy services under contract. The same types of services (satellites pre- and post- launch) to various commercial and academic organizations largely but not exclusively in Europe. Also represent the UK on international metrology committees (non EO) and also represent the UK and provide liaison on behalf of the international metrology organizations to EO standardizations and technical expert committees e.g. WMO CIMO, CEOS WGCV. |
| Respondent 8 | As chair of IVOS sub-group lead and coordinate industry and space agencies in various CEOS related task. |
| Respondent 9 | NIST works with many other U.S. Government agencies, state and local governments, and industry. UNESCO in the WG European Commission World Bank obliquely USAID ITC Netherlands (GEO) UCAR through NOAA GEONETCast (more data democracy than capacity building) |
| Respondent 10 | GEO, WGISS, WHO, EPA, WMO, Ministries of Environment, Health and Civil Security (in France, in Europe, in Africa, in the Americas) , international research organizations, international universities, ... |
| Respondent 11 | For WGISS there are several: OGC, GEO Pilots, ISO, and related EO science teams. |
| Respondent 12 | WGISS has had a long record of interaction with the Open Geospatial Consortium (OGC), ISO TC 211 Geographic |

| Question 4.4: What external organizations do you work with? Please describe at what level (use standards of, provide or products to, liaison, etc.) | |
|--|--|
| (also see interview) | Information/Geomatics, Consultative Committee on Space Data Standards (CCSDS) and others. The purpose of these interactions was liaison and contributions to the development of geospatial information systems and standards. |
| Respondent 13 | |
| Respondent 14 | GEO Secretariat (Water expert), GEO IGWCO Community of Practice |
| Respondent 15 | Question to be responded by WGCV and WGISS |
| Respondent 16 | A: MDA, which operate and own the RADARSAT-2 satellite, to reach agreement to share and distribute data. |
| Respondent 17[†] | I support Cal/val support for remote sensing systems across industry, Government, and academia. I work for USGS as Remote Sensing Technologies Project manager, and I am the CEOS WGCV chair and I lead the GEO Task DA-09-01a GEOS QA Structure. I meet with aerial and satellite agencies and companies on cal/val on a regular basis. Support NASA ESIP. Just finished 4 years as ASPRS Chair for Primary Data Acquisition Division. I work with all CEOS agencies via WGCV and I work with many agencies in the US via the JACIE and IADIWG. http://calval.cr.usgs.gov/collaborations_partners/ Standards such as ISO 19159, 19157, 19115, 19130, And others |
| Respondent 18 | NASA, USDA, Universities. |
| Respondent 19 | so far only discussions with various biodiv. Research organizations and conservation ngos |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

Supplemental Questions

| <u>Supplemental Question 1: How do you liaison with and represent SBA users or “community of practice”?</u> | |
|---|--|
| Respondent 1 [†] | |
| Respondent 2 | |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | |
| Respondent 10 | Liaison with the partners of the SBA is done through emails exchanges, and one or twice a year we have face to face meeting to report on progress or do some brainstorming. Users are invited systematically (and they attend) to our meetings. This year, and I am very happy with that, WHO accepted to supervise the writing of the Health tasks for the new GEO Workplan; this should guarantee that the deliverables will be "users" oriented", I hope. |
| Respondent 11 | |
| Respondent 12 (also see interview) | |
| Respondent 13 | |
| Respondent 14 | |
| Respondent 15 | A: For transverse activities (e.g. architecture & data, capacity building, etc..) I am interacting in my quality of co-Chair of the GEO Architecture & Data Committee representing CEOS. Since 2006, that function represents a large percentage of my time. It is part of my daily job. We have weekly or bi-weekly telecons and several meetings during the year. |
| Respondent 16 | A: POCs of each action have a direct link with the community of practice targeted by the action and review the achievements of CEOS for this community once a year in a meeting. Unfortunately I cannot attend all those meetings but I make sure to be represented. |

| <u>Supplemental Question 1: How do you liaison with and represent SBA users or “community of practice”?</u> | |
|--|--|
| Respondent 17[†] | |
| Respondent 18 | Currently, I am Coordinator , Committee for Earth Observation Systems (CEOS) Agriculture Societal Beneficial Area (SBA). In this role I support GEO Agricultural SBA activities. Currently, GEO has Joint Experiment for Crop Assessment and Monitoring (JECAM) initiative that is expected to lead to Global Agricultural Monitoring System of Systems. We at CEOS, coordinate and facilitate space agency data availability for JECAM sites. This includes not only the space agencies of many countries, but also commercial EO data providers. JECAM in turn has 12+ so called JECAM sites spread across continents and countries. Each JECAM site has site coordinators. CEOS Ag. SBA role is to ensure space agencies and commercial data providers provide data to site coordinators. You can consider both JECAM and site coordinators as our "users" . |
| Respondent 19 | Our future anticipated role is to support G20 global agricultural monitoring initiative. This is a great challenge as the data requirements will multiply many fold and requires mechanism agreements signed and agreed at highest the level. personal meetings and discussions about the added value of EO for biodiversity and missing information by EO |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| <u>Supplemental Question 2: How do you interact with the GEO SBA?</u> | |
|--|--|
| Respondent 1[†] | |
| Respondent 2 | |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | |
| Respondent 6 | |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | |
| Respondent 10 | Being CEOS SBA Health coordinator and col-lead of a GEO Health CoP is very convenient to keep inform and interact with both communities. |

| <u>Supplemental Question 2: How do you interact with the GEO SBA?</u> | |
|--|--|
| Respondent 11 | |
| Respondent 12 (also see interview) | |
| Respondent 13 | |
| Respondent 14 | |
| Respondent 15 | A: same as above |
| Respondent 16 | A: I have a direct contact with the GEO secretariat disaster SBA coordinator. I attend or I am represented in GEO meeting related to disaster. |
| Respondent 17[†] | |
| Respondent 18 | GEO SBA based in Geneva interacts with us at number of forums (e.g., CEOS, JECAM). He/she also interacts with us on G20 and other initiatives. Mainly asking what CEOS can do for GEO SBA's. However, I do see a greater role for GEO SBA, for much substantial interaction with us. |
| Respondent 19 | not very much yet, I met some SBA coordinators and discussed some issues, but more detailed interaction is needed |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

| | |
|---|--|
| <p><u>Supplemental Question 3: During the CEOS Self Study discussion at the recent SIT Technical Workshop, Respondent 5 noted that the SEO is contributing to quite a few of the activities – no specific questions to the WGs or VCs on how they work with the SEO. Please, if you would so kindly, respond to this very late question on how you work with the SEO, to rectify this failure on my part ...</u></p> <p>List, and very briefly describe where helpful, what activities your WG or SBA has carried out with the SEO, and state how these activities were determined as priority and initiated.</p> | |
| Respondent 1[†] | (1) WGISS has closely coordinated with the SEO since few years ago. Mostly WGISS supports CEOS in preparing demonstration for the CEOS booth at GEO plenary. I would say without SEO, like Dr. Brian Killough, the mission could not be complete perfectly. He organizes thing systematically and contribute a lot to CEOS. Lately, in 2011 he is assigned to coordinate for the study on the CEOS portal. He coordinates very well. We have few telecons on that subject and then |

| | |
|---|---|
| <p><u>Supplemental Question 3:</u> During the CEOS Self Study discussion at the recent SIT Technical Workshop, Respondent 5 noted that the SEO is contributing to quite a few of the activities – no specific questions to the WGs or VCs on how they work with the SEO. Please, if you would so kindly, respond to this very late question on how you work with the SEO, to rectify this failure on my part ...</p> <p>List, and very briefly describe where helpful, what activities your WG or SBA has carried out with the SEO, and state how these activities were determined as priority and initiated.</p> | |
| | <p>he attended the 31st meeting for further discussion which I think he did a good job. He is also planning to attend the the 32nd meeting to summarize about the CEOS portals study on CWIC and CEOS portals technically supported WGISS supported portals.</p> |
| Respondent 2 | |
| Respondent 3 | |
| Respondent 4 | |
| Respondent 5 | <p>A overarching appreciation I have for the SEO's work is the capacity they bring through their System Engineering background to a wide variety of applications , immediately understanding the critical aspects and proposing the most efficient mean of addressing issues.</p> <p>In the initial phases of WGClimate the fundamental contributions of the SEO will be in contributing to the ECV inventory that is proposed. Here their System Engineering background combined with the the detailed knowledge of existing CEOS resources (e.g. MIM, COVE) should facilitate and accelerate our initial assessment of ECV capability across all CEOS agencies.</p> <p>I consider the SEO members of WGClimate to be a significant resource, and appreciate their contributions to the process of initiating the WG so far.</p> <p>I consider this CEOS function to be one of the most beneficial, and emblematic of CEOS' core values, I strongly encourage CEOS agencies to continue to support this common capability into the future.</p> |
| Respondent 6 | <p>With respect to SEO collaboration, the energy SBA has worked extensively with SEO staff on several activities:</p> |

| | |
|---|--|
| <p><u>Supplemental Question 3:</u> During the CEOS Self Study discussion at the recent SIT Technical Workshop, Respondent 5 noted that the SEO is contributing to quite a few of the activities – no specific questions to the WGs or VCs on how they work with the SEO. Please, if you would so kindly, respond to this very late question on how you work with the SEO, to rectify this failure on my part ...</p> <p>List, and very briefly describe where helpful, what activities your WG or SBA has carried out with the SEO, and state how these activities were determined as priority and initiated.</p> | |
| | <ol style="list-style-type: none"> 1. Energy gap analysis, done in collaboration with ACC (when Ernie was still lead). This was completed in September 2008 and is posted on the CEOS website at http://www.ceos.org/images/PDFs/SBA/energy_assessment_091008.pdf . Shelly Stover, Kim Keith, and Brian worked with me in developing this document. 2. Following the Tokyo SIT meeting in Sept. 2008, I also worked with SEO to develop an energy SBA “thread” example. This was an initiative that Mary Kicza had started at Woods Hole, but which didn’t go much farther, as I recall. Nonetheless, Kim Keith worked with me and some other Langley people in developing some thread examples (end-to-end examples of the use of Earth observation products in end-user decision support systems) relevant to energy. |
| Respondent 7 | |
| Respondent 8 | |
| Respondent 9 | |
| Respondent 10 | |
| Respondent 11 | |
| Respondent 12 (also see interview) | |
| Respondent 13 | |
| Respondent 14 | |
| Respondent 15 | |
| Respondent 16 | |
| Respondent 17[†] | The SEO has been very good in supporting WGCV and the WGCV subgroups. SEO has also done many good things for |

| | |
|---|--|
| <p><u>Supplemental Question 3:</u> During the CEOS Self Study discussion at the recent SIT Technical Workshop, Respondent 5 noted that the SEO is contributing to quite a few of the activities – no specific questions to the WGs or VCs on how they work with the SEO. Please, if you would so kindly, respond to this very late question on how you work with the SEO, to rectify this failure on my part ...</p> <p>List, and very briefly describe where helpful, what activities your WG or SBA has carried out with the SEO, and state how these activities were determined as priority and initiated.</p> | |
| <p>Respondent 18</p> | <p>the constellations that have provided support to WGCV and the subgroups.</p> <p>The SEO most important efforts specifically for WGCV have been: 1) the requirements and development of the COVE Tool, http://www.ceos-cove.org/Login.aspx, 2) the hosting and support for the WGCV web pages, and support for the cal/val portal, 3) support of the constellation requirement and guideline documents, 4) field campaign support, and 5) providing technical information solutions ideas.</p> <p>The COVE tool has help many cross calibration and validation efforts. The SEO has also help users to develop and use the tool in planning. Key efforts where the tool has been very valuable have been the CEOS Field Campaign over DOME-C and in Turkey where the SEO provide significant support.</p> <p>The COVE tool has also been valuable for FCT and emergency response support.</p> <p>The SEO does excellent support for WGCV and the constellations, and the WGCV and the constellations have many common efforts and members. The point here is when SEO does something for a constellation, it can be very important to WGCV also. For example, the LSI FCT efforts and Guideline documents are very useful.</p> <p>NASA CEOS Systems Engineering Office (SEO), Dr. Brian Killough and Kim Keith, have done outstanding job for GEO Joint Experiment for Crop Assessment and Monitoring (JECAM) Ag. SBA activities.</p> <p>The major contribution has been the development of CEOS visualization environment (COVE) tool for JECAM:</p> <p>The COVE tool supports space agency data acquisition planning for JECAM sites around the world. This tool will allow data user to determine all existing and future satellite missions from various space agencies and help them plan</p> |

| | |
|--|---|
| <p><u>Supplemental Question 3:</u> During the CEOS Self Study discussion at the recent SIT Technical Workshop, Respondent 5 noted that the SEO is contributing to quite a few of the activities – no specific questions to the WGs or VCs on how they work with the SEO. Please, if you would so kindly, respond to this very late question on how you work with the SEO, to rectify this failure on my part ...</p> <p>List, and very briefly describe where helpful, what activities your WG or SBA has carried out with the SEO, and state how these activities were determined as priority and initiated.</p> | |
| | <p>acquisitions. Please see the youtube video on how to use COVE for JECAM:</p> <p>http://www.youtube.com/watch?v=4gYJO5bLjII</p> <p>Such a tool will have greater relevance and utility for GEO G20 Global Agricultural Monitoring (GLAM) initiative.</p> |
| Respondent 19 | |

[†] Respondents 1 and 17 sent coordinated WGISS and WGCV responses.

APPENDIX 4: Interviews

Individual emails sent to each of the Community Canvass individuals by the Study Team Lead requesting completion and return of questionnaires (see Appendix 1) included the following paragraph:

“If you would be interested in talking with me via phone as an interview, instead of or in addition to answering the questionnaire, please let me know. I would like to interview you. And, it may seem an easier and richer way to provide your information and experience. I will endeavor to make myself available at your convenience.”

Several people notified the Study Team Lead that they would be happy to be interviewed (see Appendix 3). However, all such interviews did not occur. Full responsibility is to be attributed to the Study Team Lead for the incomplete status of the interviews.

1. Interviewee 1 (also see Respondent 12 in questionnaire)

VCS were first added infrastructure. Then after a couple years the SBAs, didn't get too engaged. But the WGClimate was just as I was leaving. WGISS perspective on all this. Not much insight into other WGs and how they work with VCs and SBAs. My perspective was that interactions not that consistent. Esp. with SBAs, WGISS worked with some but not with others. With some good interactions, some other interactions.

During the Kicza she paid a lot of attention to the VCs, and to their reporting and to whether new ones should be added, nurtured the VCs and debate on whether there should be additional ones during her tenure.

SBAs – there are a lot of groups, and didn't hear much. Daunting to think about the number of permutations between WGs, and VCs, and SBAs. Manpower is a bit of a challenge. Always been a matter of limited resources, down to individuals and individual agencies that want to see something happen, those are the things that move. Sort of self selecting, people vote with their feet. At the same time, it's good if the leadership SIT and Plenary, make a case for something being done, make the connection, would help orient and good to hear at the WG level. “Nurturing” is a good thing.

Thinks GEO has been in the end good. When GEO came on the scene, at first make CEOS WGs nervous, would they be obsolete. But CEOS and GEO relationship (Rio statement, satellite arm of GEO), where CEOS is trying to be a serious contributor. That focus has been useful. E.g

Land Surface Imaging Constellation VC – Portal, Climate SBA – Portal, GEOSS Common Infrastructure – CWIC. Customers are useful for focus. Even though VCs are “us”, they are customers for WGISS, they also have constituent users. SBAs should represent users. WGISS is all about data access, takes effort to make the relationships form and sustain to understand need for and provide concerted data access.

GEO organization is a challenge, but early on it was almost like competition. Now it really seems to be a partnership. Don’t know what GEO thinks of CEOS, even though went to a lot of those GEO ADC meetings and the big GEO Task Workplan reviews in South Africa, bit of a challenge to see whether your customer is really happy. Sometimes not readily apparent. Discussions are always at many levels. Top level nice words, then down at the Task level. Ken would present CWIC and Data Harmonization at ADC, some people were receptive, but others seemed less receptive. Not good feedback. The GCI felt all the problems will be solved if everyone uses GEO standards, but CEOS saying that need to be more flexible, CWIC tailored to satellite data and helped the approach. GCI could be resistant, when we trying to help. Don’t know how that’s progressed.

SEO resources one of the few dedicated resources, has produced.

WGISS did have the subgroups and the WGISS Plenary groups long ago. WGISS decided to have all groups meet at the same time. The WGISS Plenary had the Chairs of the Subgroup go through the reports. Meeting all together was meant to open up communications. But it ended on eliminating some of the more senior managers. There is better communications, but the management level is perhaps not aware.

The measure of the success of our technologies are the customers – is that the SBAs? Technologists are wedded to certain approaches. Difficulties in working between ADC and WGISS, etc. are maybe to be expected. Maybe getting more of the customer into WGISS meetings – SBAs, and also VCs. The VCs, as an example, remember talking to Stan Wilson, and how what they really needed was better access to and interuse of the data. I said that’s what WGISS is trying to do. How can we really get to actually doing this? How many VCs, and maybe 9 SBAs. The Climate Diagnostics portal was a nice match, and Mitch really appreciated what was done. These kind of things are bilateral, targeted tasks for receptive teams. Difficult to do everything for everybody. Should go back and investigate the interaction with Health SBA, Murielle LaFaye, after the WGISS Toulouse meeting. SBAs could see, use or tweak the direction, what WGISS could offer. Good for both sides.

2. Interviewee 2

Noticed when going through it three groups, two overarching themes or threads.

1. Project (or TASK) Planning Commitment and Resourcing Process. Push in WGISS to get people to write down Project Plans, and that is fine. But the Commitment and Resources process, commitment from SIT and Plenary. Need good buy-in from Management to get commitment and resources. If significant, critical task had plan and was staffed through WG management and up through SIT with involvement of Plenary, with agencies to commit participants and resources up front, then could saw OK this is accepted as formulation of an activity. Instead of waiting until after assigned and trying to figure it out after the fact.
2. The SBAs initiated last spring or so. They are new. Need to be strong drivers or direction (priorities) coming from end user groups. Too much drive from the technical side and not from users. The SBAs can play that role if populated with User oriented. This would help the problem of priorities in work in CEOS and in interaction with GEO.

MM: Initiated much earlier than last spring.

I know that happened, but didn't get the information and didn't know which ones are rolling. Disasters is that a group? Is it a CEOS or GEO position. Does the Coordinator have a group to help, like you mentioned for your CEOS Self Study Team? Would be helpful, and esp. if from the actual end user side, not somebody involved in CEOS that is on the technical Space Agency side. Who are the real representatives from the ends user groups.

MM: After CEOS became satellite arm of GEO, CEOS seemed to quit having other customers aside from GCOS. SIT used to have members of all these other groups.

GCOS is the ultimate umbrella. Remember that the international IGCP and other groups in disciplines that had good voice in CEOS. Representatives, e.g John Townshend would be there to speak for themselves and their colleagues from an international perspective. Six or seven years ago we had connectivity in CEOS that we used to have. But when Rio happened and the thrust to be major for GEO, we lost all that focus. Perhaps the idea was that all these other groups would become part of GEO. GEO can quickly overwhelm us with lists and lists and lists of tasks. But yet there's no priority or sense of overall purpose other than trying to push a big mountain along. Worried about how wide we could spread our arms to accept all these tasks, instead of focusing on a small number prioritized to help our users.

People were overwhelmed and bewildered. Lyn says Maiden did a good job of trying to give WGISS focus and work on something of priority. Especially the Virtual Constellations. You were looking for comfort that what we did focus on would be of priority and would be welcome.

Who are those groups? VCs, some of moved along and others stagnant. Now it appears still uncertain. Are we working just for standards bodies or what?

3. Interviewee 3

- a. You are likely farther along than am I, as I had an extra step in that I set up a small team for the WGs and SBA Study Team. Do you have any preliminary findings that bear on the WGs and SBA Study Team that you think would be helpful to share with this Team?

I can't think of any. I could send you the text of the VC Study Team report, sending right now.

- b. Does your questionnaire have questions similar to this one, does it question interactions, gaps, overlaps, cooperations between VCs and the WGs and SBAs?

No not really, and not as detailed. I asked 4 or 5 questions. Only questions of Portals use and WGClimate and ECVs.

B1. Could you send "your" questionnaire? OK will send you sample.

- c. Are there questions in the questionnaire I sent to you that you wish to discuss?

Not really. Would discuss any one you want to call out.

OK, instead of focusing on the questions. For example, there may be work in the VCs on intercalibration of satellites, and in the WGCV there is such validation of products from different flying instruments. I wonder if there are communications. ON the side of the WGCV subgroups, there is variable knowledge of and interaction with the VC groups. Stephen says there is minimal discussion between the Constellations and the Working Groups.

- d. Do you think it would be helpful to my Study Team were you to fill out a questionnaire from the point of view or "hat" of lead of your Study Team?

e. Are you interested in/ would you be willing to fill out a questionnaire from the point of view of your long-time CEOS involvement and role?

Point of the call is to talk through it.

OK switch to your role as support for CEOS Plenary.

In your opinion, the addition of the VCs and SBA teams as infrastructure in the CEOS, and then also WGClimate, how has it affected the overall work that gets reported from the WGs and SBAs?

Comment on whether you think the structure is.

SBA coordinators. Only SBA effective is Climate. WGISS Portals, not of which seem successful or have much longevity. The WGCV has potential synergies, calibration, QA4EO stands on it's own.

You think the portals are successful?

Don't think the portals are successful and fit purpose. The VC leads answer is almost universal that they don't think portals have been a huge success. Expect that Brian's Portal Study will have that data. Think is was a good cooperative spirit, but don't think that every time we do something we have to make a portal for it.

Potential synergies and WGCV and the VCs are recognized by the VCs?

VCs don't have much need for working with the WGCV, don't see them rushing to work with the WGs.

How about in the case of the ECVs? I know that at least the AC VC has had meetings where there was reports on ECV-like datasets briefed by different members, and perhaps an emerging about how to mature a sort of CEOS endorsed ECV form atmos comp. Material on WGClimate and ECVs and VCs.

Fair amount of opinion around that the VCs should be involved in the ECVs. One of the axes in my report relates to that. Will involve some different membership, apart from space agencies, e.g. university people.

Is there knowledge that the WGCV focus areas are working on validation, intervalidation, and intercomparison of instruments?

I think there is a general understanding.

Did you question the VCs on their reporting, and whether they involve the WGs or SBAs.

No , only except the WGClimat for the ECVs.

So some VCs do interact with the WGClimat from their reporting?

Well WGClimat just started. Just setting up program of work. So this is more than a theoretical proposition at the moment rather than a reality.

Any other point you would like to make?

Are the sWG are going to continue as bottoms up R&D arrangement, or whether they have a more specific support role. Beyond my main activities to comment further.

Widely recognized that SBA coordinators need to be either revitalized or dropped.

Did the CEOS SIT last year remove the Weather SBA position?

There never was a Weather SBA.

What was Paul Cournet's role??

I don't know what you mean. Basically it was agreed that Weather SBA was role of WMO and CGMS not CEOS Business.

1. CEOS Voluntary Basis
 - 1.1 Is the pool of available and willing volunteers commensurate with the tasks established for each Working Group or SBA?
 - 1.2 How does communication occur among and within Working Groups, SBAs and VCs?
 - 1.3 Are there means by which new members are adequately encouraged to become more fully engaged in the Working Groups and SBA Teams?
 - 1.4 Are Working Groups and SBA Teams sufficiently responsive to current and anticipated future stakeholder needs?
 - 1.5 Can you suggest any improvements that would facilitate the vertical communications from/to the CEOS Chair and SIT to/from those at the most basic working levels (Subgroups, SBA task teams)?
2. CEOS Structure, Governance, and Reporting
 - 2.1 Are the roles, responsibilities, goals, and objectives of CEOS Working Groups and SBAs clearly defined?
 - 2.2 How much autonomy do Working Groups and SBAs have to set their scope and activities?
 - 2.3 Are there shared expectations among CEOS leaders (including WG and SBA Team Leads) regarding actions, deliverables, and outcomes?
 - 2.4 How is progress measured and documented?
 - 2.5 How does communication flow among Working Groups, SBAs, and CEOS leadership bodies?
3. Effect of Addition of WGClimate, Virtual Constellations, Societal Benefit Areas to CEOS Structure

- 3.1 Are there key ways in which the functions and activities of the Working Groups and SBAs should be improved or modified?
 - 3.2 Should Working Groups and SBA Teams be reorganized and/or consolidated?
 - 3.3 How active is your CEOS SBA? (for all SBA leads)
 - 3.4 What are the impacts, overlaps, shared or complementary roles, objectives and needs of the VCs' activities on the work in your WG or SBA?
 - 3.5 In what ways does your WG (or SBA) cooperate, communicate, and interact with other WGs, SBAs, VCs, and the CEOS executive functions? What joint meetings have you held? Are there joint meetings or other sharing mechanisms you think could be helpful? Do you have joint products or products?
4. External Organizations and GEO
 - 4.1 Are you familiar with CEOS Rio Statement? (Note: It can be located here: <http://www.ceos.org/images/General/14Oct2010-CEOS-RIO-Statement.pdf>)
 - 4.2 Do you think the relationship between CEOS and GEO is clear and well understood by your WG (or SBA)? As the 'satellite arm' of GEO, how is your WG (or SBA) contributing to the GEO System of Systems? In what ways does your WG (or SBA) communicate with GEO, i.e. through the CEOS SEC, Plenary, and SIT and also directly with GEO Tasks and crosscutting groups?
 - 4.3 Please provide an exemplary product recently completed by your WG (or SBA).
 - 4.4 What external organizations do you work with? Please describe at what level (use standards of, provide or products to, liaison, etc.)

3. Interviewee 4

Interview conducted by Brian Killough on September 9, 2011

Primary Questions

Question 1: Does CEOS have clearly-defined objectives and do you believe these objectives have been met in the past or are being met now ?

Yes. The complexity of CEOS due to international travel, many groups and diverse meetings makes it appear to others that we are not accomplishing much. We are indeed accomplishing many things and reaching our objectives.

Question 2: Are CEOS's objectives consistent with the available resources (human, physical, fiscal, and informational) ?

People in CEOS have full-time jobs which makes it more difficult to accomplish tasks. The CEOS objectives appear to be consistent with resources. The CEO and SEO were great additions to CEOS. These groups have really strengthened support to CEOS.

Question 3: How did CEOS measure and document its progress toward goals in the past and do you view the current process as effective ?

Yes, CEOS has good intent to measure and document its success. Many changes occurred with GEO in 2008, so we were focused on how to measure progress against their goals. Progress measurement is even more necessary now. It was not as good in the past, but is much better now.

Question 4: What do you see as CEOS's most important successes and/or accomplishments over the course of its history to date ?

Virtual Constellations have been the most important success over the past few years. They have focused CEOS on specific topics and distributed the work to appropriate experts in CEOS organizations.

Question 5: What are the most important new initiatives for CEOS to set for the next 3-5 years ?

Disasters. CEOS should assist with developing predictive tools and coordinate efforts with the UN framework.

Question 6: What are the most important opportunities for CEOS to improve its structure, scope, number of activities, or any other factors over the next 3-5 years ?

The CEOS structure is complex and we have too many activities. CEOS should consider 3 or 4 key initiatives each year to focus our efforts.

Question 7: Are there any activities CEOS is currently undertaking that no longer provide value to the organization and should thus be ceased ?

SBA teams. They do not appear to be very effective within CEOS and are duplicated in GEO.

Question 8: What other points or issues would you suggest the Self Study team address or consider ?

CEOS should engage with other organizations besides GEO and determine optimal methods for engagement.

Extra Questions from Martha Maiden about Data Democracy

Question: What was the intended strategy of South Africa's commencement of the Data Democracy initiative?

CEOS provided a structure and forum that could make a difference in promoting Data Democracy (DD). The cost of acquiring data and general availability are still issues for developing nations.

Question: What resources on the side of South Africa, CSIR, and other SA organizations were brought to bear in order to capitalize on Data Democracy contributions? For example, we are aware of the SA Ground Receiving Station complex, where you are able to downlink, receive, and process satellite data.

Primarily it is the SA ground receiving station. SA has also developed automatic pre-processing applications for improved delivery of data to developing nations. SA has only one satellite currently operating.

Question: What recommendations do you have for further development of Data Democracy and so-called Capacity Building, in order for CEOS contributions and participation to have lasting consequences?

CEOS should promote involvement of people currently working on CB and DD to support developing nations. Those nations need better institutional capacity to acquire and use space data.

THEMES and CONCLUSIONS (created by Brian Killough)

- Virtual Constellations has been the most important success in CEOS.
- SBA Teams are the least effective organization in CEOS and should be ceased.
- CEOS should develop predictive tools to support Disasters in the future.
- CEOS should determine optimal methods for engagement with groups other than GEO.
- CEOS should support Data Democracy by creating institutional capacity in developing nations.

CEOS SELF STUDY

INPUT FROM THE STUDY TEAM ON THE VIRTUAL CONSTELLATIONS

30th September 2011

1. Introduction

In preparation for its forthcoming chairmanship of the CEOS Strategic Implementation Team (SIT) and recognising that the latest phase of CEOS organisational development may be reaching its end, NASA has taken the initiative to lead a CEOS Self Study with the objectives of:

- identifying, articulating and evaluating CEOS successes and strengths in achieving real coordination in space-based Earth observations for societal benefit;
- identifying successes and areas for improvement;
- identifying potential new CEOS initiatives for the next 5-7 years.

The discussion at the SIT-26 meeting in Frascati (May 2011) noted a number of other objectives for the exercise, including the need to filter and prioritise proposals for such new initiatives – for which there is no shortage of good ideas.

This note has been prepared by a Study Team focused on the subject of the CEOS Virtual Constellations. It reviews the heritage of the activity since its inception and presents conclusions and recommendations for the way forward, in support of the study objectives.

2. Heritage & Context

It is important to understand the context in which the concept of the CEOS Virtual Constellations was proposed in order to fully understand their purpose and evolution. The last major strategic review of CEOS and its objectives and activities was in 2005 – the CEOS Task Force. This was in response to the emergence of GEO and the concept of the GEOSS, which, it was clear at the time, would have significant and long-lasting implications for the mandate and direction of CEOS. The CEOS Task Force activity and report to CEOS was a particularly effective exercise, inspired by the renewed focus which GEO presented and the opportunity for CEOS to take leadership on implementation of the space segment of the GEOSS. The recommendations of the Task Force have underpinned the most productive 4-5 years in the history of CEOS as a coordination body, these being:

- that CEOS affirm itself as the primary space agency forum and responsible for implementation of the space component of the GEOSS;
- to be able to monitor and demonstrate real progress, CEOS should develop a *CEOS Implementation Plan for Space-based Observations for GEOSS*. Execution of this plan and its various components should drive the annual activities and meetings of CEOS and its reporting to GEO and other relevant bodies;
- SIT Chair should oversee the implementation of the Plan and should be the primary interface to GEO, reporting on status of CEOS agency commitments to the Plan;

- The CEOS Calendar was reconfigured and defined to clarify roles of Plenary and SIT;
- The role of the CEO was established and the concept of the Troika formalised;
- A multi-year resource plan was proposed (which eventually became an annual plan developed and reported by CEOS Chair to help manage the SEC process).

About the same time, the first version of the GCOS Implementation Plan and Satellite Supplement appeared and provided further stimulus for both focus and rigour in a sustained and monitored progress of CEOS coordination activities.

In the immediate wake of these significant new activities and proposals, ESA took on the SIT Chairmanship in November 2005, and began the deliberations as to how to respond to the challenges laid down by the Task Force, including in particular that:

“The proposed CEOS Implementation Plan should be the focus for a new planning process which takes account of international users and their requirements from the outset of satellite projects.”

The CEOS Virtual Constellations Concept paper was developed by the ESA SIT team in the months following CEOS Plenary and was presented to, and well received by, the SIT-18 meeting in March, 2006 in ESRIN. The SIT team worked with interested agencies to propose a number of prototypes to apply the VC Concept, and provided an update to SIT-19 in Sept, 2006. The report to that meeting provides a useful reminder of the initial motives behind the concept:

- *the desire to move CEOS efforts and agendas from the generic to the specific;*
- *to provide a new planning process to inspire and manage broader participation in CEOS efforts by all space agencies – developed and developing;*
- *to focus CEOS outputs on the major needs expressed in the GEOSS Implementation Plan;*
- *to seek realism in coordination – recognising that individual agency needs and schedules will continue to dominate implementation – but seeking synergies and agreements on key issues to create optimal conditions for all agencies to contribute to a common objective (such as a Fundamental Climate Data Record or continuity of a certain data service).*

The focus is on common efforts towards a specific data set, product or service – not on standardisation of space hardware.

The 4 prototypes which emerged from that meeting (and their leads – at the time) were:

Ocean Surface Topography: NOAA & EUMETSAT

Atmospheric Composition: NASA

Land Surface Imaging: USGS

Precipitation: JAXA & NASA

These were selected to give balance across different domains and geographies, and perhaps most importantly with an eye on leverage of international linkages to support continuity of funding for missions at the time which were under some threat (Jason, LDCM and GPM in particular).

It is fair to say that there was considerable enthusiasm and some relief among CEOS agencies at being able to focus coordination and planning discussions on specific topic with a tangible outcome – after years of activity on an extremely broad front. The VCs proved to be an easily identifiable and communicable instrument or brand for CEOS to

explain its objectives and achievements. The concept was quickly picked up by GEO, which specified a new task (DA-07-03 – Virtual Constellations) in the GEO Work Plan, with CEOS indicated as responsible.

Recognising that the VC concept and initial prototypes would likely expand and require some formalisation in process, the next SIT Chair, NOAA, led development of a ‘Process Paper’ (November, 2008) which lays out some simple but effective procedural rules governing the development of new VC proposals, their approval by CEOS, and their implementation. At the same time, proposals emerged, and were subsequently adopted, for two additional VCs to add to the existing four, with the following initial leadership:

Ocean Surface Vector Winds (OSVW): NOAA, EUMETSAT & ISRO

Ocean Colour Radiometry (OCR): EC, NASA, ESA, ISRO

both with core goals of ensuring continuity and interoperability of essential measurements consistent with operational and/or climate data record requirements.

The only other event of significance in the trajectory of the VCs which may merit a mention is the discussion at SIT-24 (September 2009) regarding ‘Lessons Learned to Date’ led by a number of the VC leads – which was a useful exchange but without a specific outcome.

In 2011 we have 6 Virtual Constellations in implementation phase engaging a large number of CEOS Members. Leadership is provided by the following agencies (with some agencies leading multiple VCs): ESA, EUMETSAT, INPE, ISRO, JAXA, NASA, NOAA. Many more agencies are engaged in the implementation of these VCs. A proposal for a seventh VC (Sea Surface Temperature – SST) has emerged in 2011 (co-led by ESA and NOAA) and is anticipated to move to implementation phase at CEOS Plenary in November 2011.

3. Status and Outlook for the Seven Virtual Constellations

The table below summarises some of the key facts related to each of the Constellations – namely the original motive which was at least partly behind the proposal for a given VC, the main activities and outcomes to date, and a brief SWOT (Strengths, Weaknesses, Opportunities and Threats) assessment for each of the five current constellations – with Sea Surface Temperature (in approval process) added for completeness. The status and outlook for each of the Constellations is discussed in turn below.

| VC | Original (partial) motive | Main achievements & outcomes | Strengths | Weaknesses | Opportunities | Threats |
|------------|---|---|---|--|--|---|
| AC | Improved coordination of multiple (ozone) sensors | Requirements & gap analysis. Geostationary Air Quality coordination white paper. Aviation volcanic advisory project. | Active community with significant contributions from academia and other research establishments. | Broad scope – with correspondingly large number of measurements and missions and user communities. | Moving to consider harmonised ECV production. Participation from China which has an expanding AC satellite constellation is desirable. | AC not well aligned with GCOS-IP actions on clouds or radiation budget. Where do these communities fit within CEOS? |
| LSI | Landsat series potential data gap | FCT optical data coordination. Medium res payload guidelines. LSI portal. | USGS-INPE coordination on free & open data policy. Role in FCT coordinated acquisitions. | Participation patchy. LSI Portal not serving us well. Radar systems not included. | Land surface ECVs are a hot topic in post-Kyoto, REDD+, and agricultural monitoring framework discussions. Launch of LDCM and Sentinel-2 offer unprecedented capacity for coordination through VC. | FCT role will migrate to GFOI framework. |
| PC | GPM funding risk & continuity with TRMM | Effective forum for increasing PC participation (eg ISRO, CNES, EUMETSAT). Conical scanning microwave imager gap analysis. X-Cal Working Group for microwave radiometers. Reduced Megha-Tropiques data latency. | Coherent framework for sustaining and improving space-based precipitation measurement and advocating open data sharing. | Lacking universal participation (eg China, Russia). Deficiencies in precipitation measurements at mid-latitudes and light and solid precipitation measurements in polar regions. | Leveraging new partnerships and technologies for the post-GPM era PC. | Shortfall in post-GPM era of space-borne precipitation radars and conical scanning microwave imagers. |

| | | | | | | |
|-------------|--|---|--|--|---|---|
| OST | Jason series funding risk Improved Coordination (eg orbit choices, overlap etc...) | Effective OST continuity advocacy forum. Jason funding success. OST Constellation Mission Requirements Doc. | Focused with strong user requirements & community. Coordinating research and operational agencies has been key to success. | Still lacking universal participation | Solidify support for SWOT and next generation technology – combining operational and research interests. Strong US/Europe cooperation ready to be enlarged. | Fragile funding prospects for operational systems. Lack of evolution and involvement of new supply agencies. |
| OSVW | Continuity guarantee, timely and easy access to data of all missions | Joint training workshop efforts. Mutual support for science teams. | Strong link with science/producer community | Still lacking universal participation | Product innovation, timely and easy access, inter-calibrations | Fragile funding prospects for operational systems, unclear boundaries and tasking, maybe too high expectations |
| OCR | ECV development and coordination | Focused on OCR ECV and technical coordination and continuity in support. | Focused with strong user requirements & community | Involvement of agencies with emerging OCR capabilities | Develop international framework, "INSITU-OCR" for ECV assessment and quality control | OCR calibration needs more attention - collaborate with WGCV/QA4EO/GSICS |
| SST | Continuity of SST for applications in short, medium, and decadal time scales in the most cost-effective and efficient manner – taking full advantage of the existing and mature GHRSSST. | This VC is still in proposal but anticipate - fully functional NRT delivery of standard products and services via GHRSSST, ECV development, scientific and technical coordination with strong continuity and support. | Focused with strong user requirements & community. Significant resources committed via GHRSSST mechanism, extensive and active user/producer community buy-in already evident | Full involvement of critical CEOS Agencies is not achieved yet. Sustained capability for Constellation-critical Passive Microwave SST not guaranteed. Multitude of 'new' coordination bodies | Use of existing GHRSSST framework allows rapid progress. Coordination of SST for ECV and inputs to WG-Climate. Inputs to WGEdu Optimisation of physical SST constellation (satellites) over the next 20 years | How will the SST-VC work with CEOS to solve problems (decisions and recommendations?) Insufficient traction for VC recs in CEOS - ignored or used sub-optimally. |

AC – Atmospheric Composition

The AC Constellation was in fact originally proposed to be focused on Ozone monitoring coordination (noting the many and diverse plans in place), but subsequently became broader to consider Atmospheric Chemistry and then again to be named Atmospheric Composition. It cites its main objective as being to ‘establish a framework for long term collaboration among CEOS agencies..’. And the main activities and outcomes include a requirements and gap analysis (including recommendations to CEOS Plenary to fill certain gaps). Specific projects relating to data coordination for particular applications (eg in relation to Aviation Alerts for Volcanic Eruptions). The Constellation also offers coordination support regarding implementation of CEOS tasks responding to the GCOS IP.

The AC has recently indicated that it will move to study harmonised ECV production – in line with the move to systematise such efforts within CEOS as part of the WGClimate activities.

NASA and DLR have invested effort in preparing a portal for AC information and datasets – putting a CEOS badge on resources of the World Data Centre for Remote Sensing of the Atmosphere.

LSI – Land Surface Imaging

The LSI Constellation was partly motivated by the potential Landsat continuity gap and the need to fill it through improved international coordination. The main objectives of the LSI are: coordination on mid-resolution land surfacing imaging satellite systems (and development of guidelines in support of that coordination – due for completion later in 2011 under SEO leadership); and the support of production of climate data records for GEO and CEOS priorities. A significant effort has been invested by LSI leads (essentially USGS and INPE) in support of the optical data coordination requirements of the GEO Forest Carbon Tracking National Demonstrators and the CEOS space-date role therein. And is contemplating a similar role should the JECAM task emerge as an active CEOS priority. The GEO FCT data coordination role is anticipated to become an operational activity and to be undertaken within the GFOI Project Office in due course. The need will remain however and indeed intensify for coordination on the development of related climate data records and ECVs. An LSI Portal has been developed in collaboration with WGISS.

PC – Precipitation

The Precipitation Constellation was partly motivated by the risk to GPM funding and extension of the TRMM mission. The Precipitation Constellation efforts continue to leverage the development of the GPM constellation of satellites, which unifies and extends the capabilities of space-borne precipitation measurements evolved during the TRMM era. The multi-national, multi-agency GPM mission will be the first formal instantiation of the CEOS PC to establish a new reference standard for precipitation measurements from space and provide next-generation 3-hr global precipitation data products for scientific research and societal applications. This GPM phase of the PC also offers an integrated framework for international cooperation on inter-calibration of satellite precipitation sensors, remote-sensing algorithms, ground validation, data dissemination, and data utilisation. In addition to the realisation of the GPM mission (a constellation itself), the

objectives of the Precipitation Constellation include support towards climate data records. The team supports various studies in support of requirements for precipitation products from space, including several characterised in the GEO WP (eg a study of the availability of conical scanning microwave imagers). The PC is currently studying the establishment of a data portal through which users can directly access all PC member produced precipitation data.

OST – Ocean Surface Topography

The Ocean Surface Topography Constellation was partly motivated by the risk to continuity in Jason series funding and operation. Its objective is to implement a sustained, systematic capability to observe the surface topography of global oceans. A relatively small number of CEOS agencies fund and operate such observations and importantly all are actively represented in the Constellation (except Chinese agencies) – CNES, ESA, EUMETSAT, ISRO, NASA, NOAA. The Constellation has maintained a very strict focus on the requirements of the main operational and climate user communities and the data characteristics they require, including in relation to mission overlap, accuracy and calibration.

This focus has fostered discussions around required programming and provided leverage for funding of national activities – and can claim some of the credit around successes in securing the necessary continuity of observations for the time being. The Constellation has become established as a visible and respected advocacy group for that purpose with a strong user pull. Publication of the OST Constellation User requirements document is seen as a major achievement, as is the execution of the training courses to improve product exploitation in developing countries.

The AVISO & RADS portals provide easy access to inter-calibrated, integrated data for research use

OSVW – Ocean Surface Vector Winds

The Ocean Surface Vector Wind Constellation was in the second wave of constellation proposals – inspired by the success of the likes of OST Constellation in providing an expression of important continuity and data characteristics for key user communities in the domain. Focus and approach are very similar to the OST Constellation, engaging the small club of CEOS agencies that fund and operate such observations (CNES, ESA, EUMETSAT, ISRO, NASA, NOAA) – all of whom are actively represented in the Constellation (except Chinese agencies). The Constellation has maintained a very strict focus on the requirements of the main operational and climate user communities and the data characteristics they require, including in relation to mission orbits, data integration, accuracy and calibration. Training courses have been provided to promote use of satellite wind & wave products in marine forecasting.

OCR – Ocean Colour Radiometry

The Ocean Colour Radiometry Constellation also belongs to the second wave of constellation proposals, and picks up where IOCCG has laboured for years in ensuring coordination and continuity in this specialised class of instruments aimed at ocean colour and their importance in global carbon and climate studies. The Constellation has a strong focus on implementation of the OCR ECV and has defined a number of activities in support of that, including in relation to sensor inter-comparison, product validation, and the fundamental gap analyses relating to continuity of adequate supply. The Constellation has been led by EC-JRC, NASA and JAXA (now transitioning to ESA, NASA and ISRO)

and is supported by all agencies with a significant ocean colour observations programme (including CNES, CSA, ESA, EUMETSAT, ISRO, INPE, Korea, NOAA).

SST – Sea Surface Temperature

Sea Surface Temperature is the newest of the Constellations and remains in proposal stage as of September 2011 - with the expectation of approval to implementation at CEOS Plenary in November 2011. It is focussed on: the continuity of SST for applications in short, medium, and decadal time scales in the most cost effective and efficient manner; improvement of the SST ECV; providing a focused vehicle for the coordination of data continuity, integration, calibration; and the overall ECV Data Processing Framework. It is proposed to implement the SST Constellation by building on the existing Group for High Resolution SST (GHRSSST) framework which has developed, implemented and operates a Regional/Global Task sharing framework in which SST data products are provided - according to user requirements in a common format with uncertainty estimated in NRT. Some 100 Million products have been delivered to date over a 5 year period. The Constellation is led by ESA and NOAA and is supported by all agencies with a significant SST observations programme. This Constellation has a solid foundation and is working at 'the sharp end' of data products and ECVs, and fully interacts with the scientific and operational user communities.

Matrix of active participation and domain

The table below summarises the domain (atmosphere, ocean, terrestrial) relevant to each of the Constellations, as well as an indication of which agencies are truly actively engaged in support of the Constellation objectives (as opposed to the long list of CEOS Members that might be identified as participating but may not in fact be active). Leads are indicated with a solid circle.

| VC | Domain | CNE S | CSA | ES A | EUM. | INP E | ISR O | JAX A | NAS A | NOAA | USGS | Other |
|----------|-------------|----------|-----|---------|------|----------|----------|----------|----------|------|------|----------------|
| AC | Atmosphere | O | O | • | O | | | O | • | O | | DLR, academics |
| LSI | Terrestrial | | | O | | • | | | O | O | • | |
| PC | Atmosphere | O | | | O | O | O | • | • | O | | |
| OST | Ocean | O | | O | • | | O | | • | O | | |
| OSV W | Ocean | O | | O | • | | O | O | O | • | | |
| OCR | Ocean | O | O | • | | O | • | O | • | O | | EC, Korea |
| SST | Ocean | O | | • | O | | O | O | O | • | | |

It is interesting to note that:

- in the GCOS Implementation Plan, the Atmosphere (9) and Terrestrial (10) domains dominate the Essential Climate Variables which are supported by space-based observations (compared to 7 of the Ocean);

- conversely, the Ocean domain is the subject of 4 of the 7 active Constellations, whilst Terrestrial has just 1 and Atmosphere 2 (albeit one with an extremely broad scope at present); this may reflect a proactive approach by the relevant communities to what they saw as the effectiveness of the OST Constellation process and the opportunity to raise the profile of ocean observing requirements within CEOS and its agencies. Regardless, CEOS should no doubt consider the balance of effort across the constellations and whether they properly reflect the policy imperatives of the day;
- the largest CEOS agencies (both research and operational: ESA, EUMETSAT, ISRO, JAXA, NASA and NOAA) dominate the active membership and leadership of the VCs (although cited, ISRO have been commented as not always active in several of the teams).

4. Assessment

The Constellations Concept & Process

1. The Constellations concept freed CEOS from a paralysis resulting from the enormous scope of the challenge it faced – after years of discussion on coordination across a very broad front. The concept provided a new vehicle for a focused conversation on coordination and for its reporting to CEOS on progress and challenges. This was badly needed and quite timely with the coincident arrival of GEO, as well as the GCOS IP.
2. The Virtual Constellations are a highly effective ‘brand’ and vehicle for CEOS and its Members. The concept is widely known and discussed as an illustration of the more focused and effective nature of CEOS activities in the GEO-era. The concept may be popular since it is easily understandable and maps well into the way specific user communities are organised and mobilise their advocacy efforts. This mapping in fact seems key to success and provides strong counterparts and drivers for progress and outcomes by the Constellations. CEOS has performed best when presented thus with a strong counterpart - which sets down a challenge to CEOS of common interest to its Members. GEO and the GCOS IP being other examples. The GEO community has responded strongly and positively to the concept of the Constellations and woven the concept in as a highlight of the work plan.
3. It appears that the brand of the Constellations is sometimes stronger than awareness of the substance, with few people outside of the teams actually being aware of their detailed objectives and activities – whilst still being extremely positive about the Constellations (or their image of them).
4. The Constellations are seen within the community as having significant promise as a vehicle for focused discussions on harmonisation of programmes and plans of participating agencies in support of a common goal – be that continuity of observations for a particular operational community or in support of a particular ECV over many years and decades. To date, that concept has not fully realised this promise since the early Constellations have sometimes focused on coordination of the programmatics – the scheduling of the launches etc. To realise its full potential, the Constellations concept should embrace inclusion of the physical results of coordination – the ‘sharp end’, such as the **ECVs and data products themselves**. These are the currency and language of the policy makers, of governments and the treaties and protocols they use to define common information needs.

5. The Constellations were ‘born’ at a time of significant and rapid organisational change for CEOS and for GEO and their scoping, and guidance on implementation were perhaps fuzzier than they could have been. The process aspects were corrected somewhat later with the development of the Constellations process paper, but the scoping and outcomes of the individual Constellations were not addressed, and the time is perhaps right with this CEOS Self Study to tackle these. Feedback from the Constellation teams suggests that the more specific and focused the Constellation objectives are, the more direction and sense of purpose the individual Constellation team has, and the general impression of progress by the community is more tangible.
6. Four of the seven active Constellations are focused on the ocean domain. CEOS has no process for prioritising the selection of new Constellation topics or for ensuring balance in topic across the full set of Constellations. This may or may not be necessary, but a partial solution could be possible in the form of the requirements and priorities being driven by the WGClimate and by any subsequent Climate Architecture, which is the subject of current discussions. The Constellations have the potential to be a productive instrument of implementation for the Climate Architecture.
7. CEOS (Plenary or SIT) has no formal mechanism for following through and responding to the gap analysis results presented by the Constellation leads which may raise continuity or coverage challenges. The more specific the recommendations can be, and the clearer the impact of supply shortages on the constellation outcomes (like an ECV or operational service supply) the more likely it is that CEOS and its agencies can respond – but there remains a need for a formal follow-up process which directly engages the critical supply agencies at the appropriate level and considers solutions, prospects and alternatives as part of an impact assessment.

The Constellations process will only be effective if there is traction within individual funding agency planning processes – which we all know are subject to multiple influences. But it seems clear that the benefits of international collaboration as communicated by clear messaging from the Constellations can and does have an impact. [Although this report focuses on the VCs, similar conclusions can be drawn in this regard for the recommendations put forward by the CEOS Working Groups.]

8. CEOS has completed a highly productive phase of its organisational development, thanks to the efforts of the CEOS Task Force in 2006 and the emergence of a strong counterpart and customer in GEO. The current situation might be characterised as CEOS being a victim of its perceived recent success – with many opportunities being presented for more intensive coordination of data acquisitions and supply, and with subsequent uncertainty as to how to prioritise and how to resource these many demands. It should be recalled that the Constellations were a remedy to the difficulty of progress by CEOS on a very broad front, bringing focus and expert leadership on specific challenges and opportunities. There may be no definable limit as to how many Constellations are practically supportable by CEOS, with hopefully the requirements of leadership as defined in the Process paper being sufficient to limit proposals to only those with well-resourced leaders and a common purpose. The question of priorities and limit of resources remains however an open issue for CEOS to address in 2011 given the current environment and emergence of new ideas – and applies equally to the Constellations.

9. Several of the Constellations have pioneered new partnerships between research and operational space agencies and these have significantly strengthened the prospects for continuity of observations. This is an important benefit of the Constellations, as a vehicle for developing such partnerships, and should be taken into account in future planning. It has been noted that the existence of the GCOS IP, and of the CEOS Constellations, has given some assurance to the user communities that there now exists a systematic framework, engaging all the key players, in ensuring that requirements are understood and mechanisms are in place for ensuring the necessary supply and continuity into the future.
10. Noting: the success of the research and operational agency partnerships in the Constellations; the suggestion that the Constellations concept should embrace physical results such as ECVs and data products; the emergence of an overarching Climate Architecture as a framework for more effective coordination of both research and operational space agency mission planning – encompassing efforts of CEOS, CGMS and WMO Space Programme. There would appear to be a real opportunity and growing goodwill with respect to the coordination opportunities, for the Constellations process to be an effective implementation vehicle welcomed by all relevant coordination bodies.

Individual Constellations

11. One of the original motives behind the Constellations concept - using leverage of international collaboration and common purpose to secure domestic budget guarantees - is as valid as ever in these days of lean government budgets. But the specific motives related to some missions which may have inspired selection of original set of 4 Constellations may no longer apply and the time is right for a systematic consideration of the scope and objectives of each Constellation and whether any refocusing is required.

Implementation potential

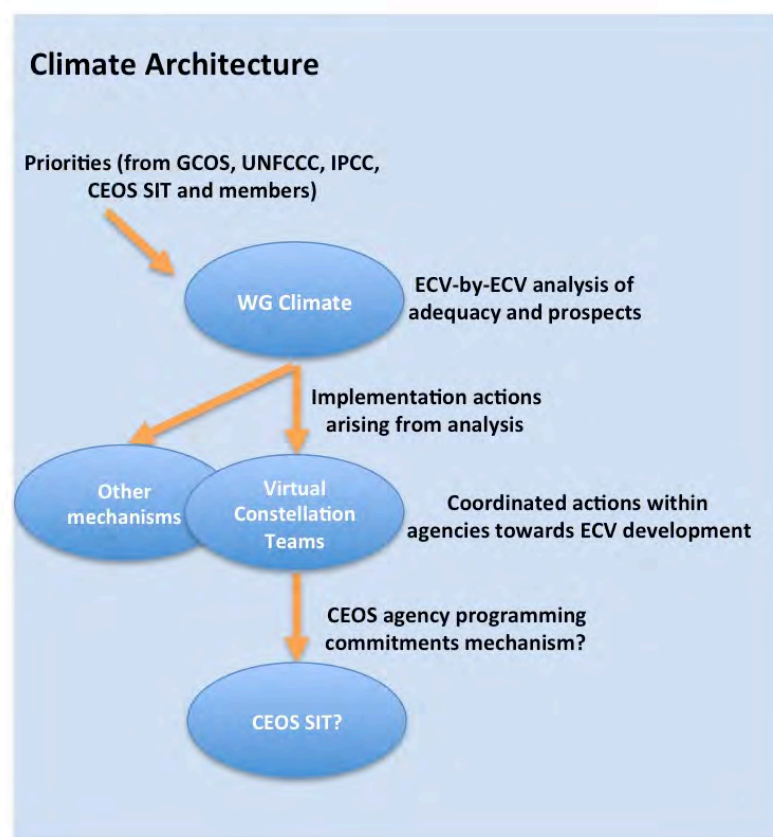
12. We have heard a number of calls during 2011, suggesting that the Virtual Constellations become more focused on implementation and product delivery, and thereby to become a key instrument in the space segment of the climate architecture, and a mechanism for delivery of coordinated ECVs – in concert with the systematic analytical efforts within WGClimate. The foundations exist for the Constellations to be used in this way – indeed some Constellations cite the coordinated development of one or more ECVs as their principal objective (particularly the more recent Constellations).

Some would require a refocusing of their objectives, and probably a corresponding change in membership to ensure experience and responsibility relevant to agency ECV activities, and to engage the community outside space agencies which is active in ECV support and development. Further, CEOS would require a process for prioritisation of new Constellations to be consistent with Climate Architecture priorities and to ensure a suitable mapping of activities anticipated under the Climate Architecture and WGClimate. An effective partnership between the Constellations and the WGClimate would lie at the heart of this implementation mechanism for CEOS and its agencies. It would represent a new level of systematic and implementation-focused coordination

by CEOS in the climate domain. This is suggested in the schematic below. Specific roles and responsibilities would need to be clarified.

Specifically, the VCs can have a role in encouraging agencies to establish consistent frameworks for production and maintenance of the ECVs within their domains (potentially in collaboration with WGClimate). VCs could maintain a role in support and coordinating the agency activities from the international perspective after the definition of the framework.

A significant majority of VC leads interviewed in the course of developing this report expected that the VCs, or some evolution of them, could and should serve this implementation role for CEOS – subject to recognition and assignment of the additional resources and membership expertise.



13. On the matter of an implementation response to the Constellation outputs (like recommendations from gap analyses), there is general recognition that the consequences or objective must be framed in terms which are consistent with national policies and requirements to be relevant and compelling to space agencies sufficiently to consider impacting their programming. It is not sufficient to point out that (eg) ozone column continuity is at risk in 5 years. This approach is appropriate for operational communities (like OSTC and OSVW) but less so for other communities. In this regard, the use of ECVs or CDRs to provide a focus of interest to the key supply agencies is appealing. (Some VC leads cautioned that CEOS not put all its eggs in the climate basket, whilst recognising the potential of collaborative ECV targets as a

systematic and long-term framework which can direct national mission planning and prioritisation in the way which is needed).

14. It was pointed out in the CEOS Response to the GCOS IP in 2006, that CEOS has an on-going role with respect to UNFCCC now to coordinate and report on the space-based observations in support of the GCOS IP. But the institutional heritage and traditional roles of many CEOS space agencies do not lend themselves to consideration of the data aspects of ECV development – which often involve very different communities, outside space agency staff. Indeed WGClimate was inspired by this very fact, and some agencies now have their own programmes aimed at expanding their roles to include ECV development – but this is not universally the case. Some Constellation Leads pointed out that the respective roles of the Constellations and of WGClimate would have to be very carefully defined in any proposed implementation mechanism in support of a Climate Architecture. WGClimate comprises the right skill set related to data aspects of ECVs, whilst the Constellations are strong in relation to the space hardware and the programmatic aspects of providing the required missions and observations. Any solution would be advised to reflect these natural strengths and to play to them.
15. Constellation Leads have in the past come to CEOS (SIT or Plenary) with results of their gap analyses and appeals for coordinated solutions. CEOS Plenary is not a traditionally productive venue for receipt of such challenges and has no formal mechanism to follow up and implement the kind of focused discussions among space agency staff responsible for budgets and programming that might influence plans in response to the challenges highlighted. To ensure the final yards of the paths to implementation are paved for CEOS it should consider new mechanisms to address this.

Constellation outputs, like the Air Quality White Paper from the ACC, represent a portion of one item amidst around 30 items on increasingly busy SIT meeting agendas. It is hard for Principals to isolate what is new and important from what is not or is routine reporting. SIT has become more like CEOS Plenary in attendance and format – having originally been envisioned as a small group of the most senior space agency representatives with implementation authority, being asked to debate specific implementation challenges.

It is very difficult for individual Constellation Leads (or indeed WG Chairs) to gain attention of assembled CEOS Principals given so many competing agenda items - with no real guidance to Principals on what might be important. For the Constellations to evolve to realise any potential as an implementation mechanism (for ECVs or indeed any objective) – this deficiency needs to be urgently addressed. A new approach to SIT agendas may be the solution, with the SIT Chair team working in advance with Constellation Leads (and other groups that input to SIT meetings?) to identify recommendations with implications for implementation by CEOS agencies and to elevate these such that their importance is stressed to CEOS Principals when raised in the SIT meetings – or in special sessions therein. This step does not guarantee an implementation outcome, which is dependent on national programming changes and budgets and therefore ultimately beyond the influence of a voluntary coordination framework, but would in itself be a significant improvement in the efficacy of CEOS efforts, and within its sphere of influence.

16. Constellation Leads have been asked whether it is desirable to impose more specific terms of reference on the Constellations to ensure more consistency in purpose across the different teams. There is strong resistance from Constellation Leads to any suggestion of a 'one size' template to be imposed on existing or new Constellations – with the belief that the Constellations process can be and should be applied to a range of different challenges for CEOS and its agencies. From space segment coordination, through to ECV development support. It seems advantageous to CEOS to allow Constellations to continue to support activities other than directly related to a physical output and in support of requirements other than climate – reflecting the diverse nature of the GEOSS stakeholders and of CEOS member interests beyond climate. This would include continued support to operational communities through the likes of OSVW.
17. Four of the seven active Constellation teams relate to ocean observations – this is indicative of the need for a process for prioritisation of new Constellations and to ensure balance consistent with CEOS, GEO and GCOS priorities.
18. Given the opportunity of this CEOS Self Study, Constellation Leads were polled and asked to consider - in light of the on-going discussions regarding use of the Constellations as an implementation vehicle and with a strong focus on physical outputs, notably in support of the Climate Architecture – how they might refocus their activities and objectives. The conclusions are summarised in the table below.

| VC | Activities & outcomes to 'prune' | Activities & outcomes in next 3 years | Notes |
|------|---|--|---|
| AC | Portal is not core business. Gap analyses not productive without CEOS response mechanism. | Improved volcanic aviation forecasts. Updated AQ Constellation Paper. 1 or more harmonised ECV activities (starting with total ozone). Implementation of CEOS Carbon Strategy of interest. | Some discussion on addressing aerosols and/or clouds – but this would further broaden ACC scope. Interest in increased collaboration with WGCV Atmospheric Composition Subgroup. |
| LSI | LSI Portal – subject to context of CEOS reviews. | Mid resolution guidelines document will be finalised soon. Use models will be developed in support. Re-focused LSI portal. On-going support to FCT/GFOI and JECAM. | LSI portal enhancements to be discussed and relationship to WGISS activities. Portal in limbo at present pending CEOS review of portals. |
| PC | None | Deployment of GPM phase constellation satellites and maintaining continuity with TRMM. Advocacy of post-GPM phase PC . Possible PC portal under study. | Opportunities and challenges of transitioning measurements to operational systems and agencies. Opportunities and challenges to improve measurements through new technologies. |
| OST | None | Evolution towards incorporation of surface water hydrology into OST. Looking at lakes and rivers as well – bringing in research systems (SWOT) combined with operational. Jason-3 realised and Jason-CS conceptual plan. Prepare users for new products (SAR mode, coastal products) and new technology (SWOT). Continue to ensure improved access and use of constellation products. | Roles and responsibilities re ECVs need to be understood. There are many other networks (including in-situ) and measurements related to sea level that would need to be considered. |
| OSVW | None | Second and likely a third | Cal/Val is the task of the individual |

| | | | |
|------------|---|---|---|
| | | training workshop. Demonstration of a single point-of-access for data. | agency and likely more in the realm of science teams and science advisory groups. |
| OCR | Having only recently started, OCR-VC has already recently prioritized its activities to focus on ECV implantation and assessment. | Establishment of INSITU-OCR. Report of the OCR product uncertainty | |
| SST | None | SST ECV development. Continuation of GHRSS NRT delivery capabilities. | In proposal stage at present (Sept 2011) |

5. Recommendations

1. The Constellations are the main tool through which CEOS pursues domain-specific coordination. Participation by key CEOS data provider agencies is not universal in the Constellation teams and should be tackled directly.
2. Four of the seven Constellation teams are in support of ocean observations and some prioritisation process may be needed to ensure a future balance of effort is guaranteed – consistent with CEOS priorities. This may be provided by the engagement proposed with WGClimate and possibly the Climate Architecture, amongst others.
3. Constellation partnerships between research and operational space agencies have significantly strengthened the prospects for continuity of observations and this model should be taken into account in future planning of new Constellations. The willingness to embrace a comprehensive coordination framework through the Climate Architecture may provide a path for effective engagement of both research and operational space agencies, and their respective coordination bodies, in Constellation activities and objectives.
4. To realise its full potential as an implementation mechanism for the GEOSS, the Constellations efforts should give greater emphasis to the physical results of coordination – the ‘sharp end’, such as data products and ECVs. There is an immediate demand for such implementation support – aiding the ECV inventory and coordination efforts of the WGClimate. This will require real resources and may require additional membership for Constellation teams.
5. The SST-VC has volunteered to serve as a pilot for the demonstration of the implementation partnership between Constellations and WGClimate.
6. As the Climate Architecture effort evolves from a badgeless activity to considering which existing assets and processes might be engaged or adapted in support of the functional and physical architectures, the role for the Constellations should be carefully considered.
7. The Constellations address a range of different coordination and implementation issues, reflecting the diversity of real-world challenges for CEOS in realising the space segment of the GEOSS. Any change in terms of reference or to the Constellations

Process Paper should recognise the value of such diversity and not ‘over-standardise’ in a way which might restrict contribution of the Constellations to CEOS objectives.

8. The SIT process and meetings should be redesigned to identify, and escalate as appropriate, important outputs from the Constellations which have implementation implications, and to guarantee debate between Principals with supporting observation programmes.
9. It is beyond the scope of this study to consider the effectiveness of the Constellation recommendations, through CEOS, in influencing the mission budgeting and programming decisions of individual space agencies. It has been noted however that agencies need a goal to subscribe to that reflects their national policies and requirements and the Constellations have made progress this direction. Their attention to ECVs may provide a focus to which agencies and governments can subscribe and communicate back home to implement programming decisions.
10. The Constellation teams should have more direct representation on the CEOS SEC meetings to ensure that Constellation-related business stays on the management radar throughout the year. This could be via a nominated representative responsible for collating and distilling inputs from the Constellations to SEC.
11. Constellation teams have catalogued their planned outputs for the next few years in the course of this CEOS Self Study. CEOS should review this output and determine whether these achievements reflect the organisation’s ambitions. A dialogue between SIT Chair and Constellations to this end would be a logical next step.

REFERENCES

1. CEOS task force on future relations with GEO and the implications for CEOS: Final Report – July 2005
2. The CEOS Virtual Constellation Concept (S Ward and D Vidal-Madjar) – March 2005
3. CEOS Constellations Presentation @ SIT-28 – March 2005
4. CEOS Constellations for GEO – Process Paper – November 2008

Annex 4:

Findings and Recommendations from Past Leadership Interviews

One facet of the CEOS Self Study protocol was to reach out to past CEOS leaders for their thoughts on CEOS. Nineteen individuals were interviewed through this process, including ten leaders from the time period 2005 to present, and nine leaders from the time prior to 2005. These interviews were conducted by members of the Steering Committee, often with one or more other members in attendance. Interviews were conducted by telephone, in-person meeting, or via mail-in response. Questions were tailored to each group of leaders, but were concentrated on elucidating each past leader's thoughts and recollections regarding CEOS objectives, follow-through, challenges, successes, and their opinions on the future direction that CEOS should take.

Interviewees were promised that their responses would not be attributed and that the notes from individual interviews would not be distributed beyond the Steering Committee, in order to ensure that they could speak freely and frankly. In order to honor that commitment yet provide the basis for Steering Committee recommendations that arose from this part of the process, the following summary of the major questions asked, and interviewees' responses, is provided.

Different sets of questions were used for pre- and post-2005 interviews (see Annex 5), but the responses tended to converge on a few major themes, some of which follow the original questions closely and some of which did not. In order to make this summary manageable and avoid repetition, responses as summarized below have been categorized according to these themes rather than to the original question sets.

Are CEOS's objectives clearly defined?

There is a general perception among past leaders that CEOS's objectives have evolved substantially. It began as an internally-focused group, with an original emphasis on technical coordination and cooperation among space agencies, with specific interests in calibration/validation, data format standardization, interoperability, and mission planning and coordination. These objectives were part of CEOS's original purpose and helped to leverage scarce resources.

It has since moved to a more external focus, in which it was felt that the emphasis has moved away from internal coordination among CEOS members and toward coordination with and provision of services for external bodies, including information systems and services and capacity building. While the interaction with external bodies such as GEO/GEOSS, GCOS, UNFCCC, and others, and the increased focus on global issues (e.g. observing strategies, gap analysis) have been important forcing functions that have helped CEOS focus its efforts, the current predominantly external focus has not been without a price. CEOS's activities are now dominated by dialogue with and tasks identified by these outside organizations, CEOS's success is largely measured through its ability to respond to these external forces, and there is substantially less focus on internal coordination among space agencies.

However, the need for the original emphasis centered on technical matters (cal/val, interoperability, coordination of missions, etc) has not ceased, and the need for continued coordination in these areas is evidenced by their prominence in highly active CEOS working groups. So in fact, CEOS's objectives have not strictly evolved: they have grown, and now encompass both internal and external relationships, tasks, and coordination issues.

FINDING: *CEOS's objectives have not evolved in the sense that the early needs were met and then replaced by new needs. Rather, CEOS has continued to address at least some of its original objectives, while*

accreting substantial new ones. CEOS's scope has grown, not evolved, and its current portfolio of goals is much more ambitious than it was in the past.

RECOMMENDATION: The current portfolio of objectives should be explicitly articulated as a tool to help CEOS make informed decisions, to match activities and scope to resources, and to ensure that the right items are receiving the most attention.

Are CEOS's objectives being met, and are objectives consistent with available resources?

The material provided to interviewees (see Annex 5) included the three primary objectives of CEOS:

- 1) To optimize benefits of space-borne Earth observations through cooperation of its Members in mission planning and in development of compatible data products, formats, services, applications and policies;
- 2) To serve as a focal point for international coordination of space-related Earth observation activities; and
- 3) To exchange policy and technical information to encourage complementarity and compatibility of observation and data exchange systems.

All respondents emphasized the innate value of CEOS as a coordinating body. There is general consensus that CEOS is good at defining and meeting short-term objectives and handling specific tasks with concrete deliverables, but that CEOS is substantially less effective at meeting its longer-term and/or strategic level objectives. Multiple respondents noted that CEOS responds most crisply when short-term tasks and requirements are provided by external organizations, but that it is less effective at identifying its own requirements at the present time. There was consensus that expectations need to be matched to realistic timeframes & resources.

While all recognized the value of specific tasks and objectives provided by external organizations, there was a clear sense that CEOS has allowed one of its core competencies to fade as a result; in the press to respond to external organizations and provide short-term deliverables in response to their taskings, CEOS no longer functions well as an arena in which agencies can coordinate the planning of satellite missions, or discuss and solve concrete problems.

Most respondents felt strongly that the current voluntary nature of CEOS participation and contribution is the best and only mode of operation for CEOS. Past leaders emphasized repeatedly the importance of matching objectives and tasks to available resources.

They also emphasized that a major issue for CEOS is that it has no process for selecting new activities or objectives, and that this is a crucial flaw since there are, and always will be, far more good ideas and genuine needs than there are resources to support them. Without a selection process, CEOS continues to find it difficult to address problems that might arise, and has no mechanism to manage the stresses posed by ambitious goals during times of economic downturns, or when members are unable or unwilling to fully participate in activities. Similarly, since decisions are generally taken by acclamation, activities that do not receive unanimous support are sometimes left in an uncertain status.

A corollary that is implicit in the points above is that without a clear process for choosing its activities, CEOS also has no clear, fair mechanism by which to identify those activities that are within its scope, as opposed to those that would better be done by other coordinating bodies. Leveraging the scope and competencies of other coordination bodies would be another way for CEOS to focus on its strengths and resist "scope creep."

FINDING: CEOS has no clear process for selecting or approving new activities or tasks. As a result, each new proposal is handled ad hoc, and the reliance on approval by acclamation can leave proposals in an uncertain status.

RECOMMENDATION: CEOS should develop and implement a process for selecting new activities and tasks. The process should be cognizant of potential scope creep, and should include an assessment of whether a proposed activity is supportive of CEOS objectives, whether there are appropriate resources for the activity, how CEOS will adjudicate among multiple good proposed activities, and how decisions on new activities will be taken.

Does CEOS do an adequate job of measuring and documenting progress?

There was a general sense that CEOS does not do sufficient to measure and document its progress. Some respondents noted that measurement and documentation, while insufficient, have most likely been commensurate with the best-efforts nature of CEOS. It is the case that documentation is spotty, and though better in recent years, CEOS's online archive does not contain record of decisions, metrics, or progress in easily-retrievable form. Respondents noted that the appointment of the CEO, DCEO, and other dedicated individuals has helped, and that involvement with GCOS and GEO helped by establishing clear needs and then providing defined sets of objectives against which to measure. In general, this type of routine documentation is not easy to sustain. Overall, CEOS has not been effective in this area.

The approach of having established work plans against which progress is measured requires setting clear objectives and disciplined implementation; it also requires that work plans be coordinated among different sub-organizations and levels within CEOS. The overall CEOS work plan is not easily found, and is heavily biased toward the specific deliverables of the GEO Work Plan at the expense of overall CEOS strategic goals. There is concern that because of this, CEOS progress is tacitly subsumed as GEO progress. It was also noted that the Working Groups and Virtual Constellations have work plans, and that one can find documents detailing discussions and minutes, but with little attention to the strategic level (e.g. what is the group trying to achieve, and where does the group want to be a few years hence).

Respondents noted that the fora for reporting progress are the Annual Meeting and the SIT meetings, and that it is possible that these may be sufficient for internal documentation. However, although the outputs from these meetings are posted on the CEOS website and in the newsletter, these outputs are neither attuned to nor sufficiently visible to decision-makers.

FINDING: CEOS documents its work internally, but does not adequately record its accomplishments or convey its progress to decision makers. CEOS needs its own progress report and metrics that speak to CEOS strategic goals and objectives, of which its responsiveness to other organizations is a part. CEOS has accomplishments and strengths that are of use to decision makers at the national and international levels, and these should be made visible in order to gain an appropriate level of political attention and financial support for members.

RECOMMENDATION: CEOS should evaluate and harmonize the work plans at its various working levels, and ensure that it has an overall work plan that reflects CEOS strategic goals and objectives.

RECOMMENDATION: CEOS should evaluate what documentation of decisions, actions, and progress it genuinely needs and that is commensurate with resources, and it should establish internal processes to sustain that documentation effort.

RECOMMENDATION: CEOS should consider developing an annual product, presentation, or other deliverable that is attuned to decision makers and that documents CEOS activities, accomplishments, and goals.

What are CEOS's most important successes and accomplishments?

Perhaps the most important success of CEOS is one of the goals implicit in its creation, i.e. success in providing an opportunity for space agencies to talk with each other, to collaborate in planning, and to exchange information on calibration/validation, distribution, data policy, cataloguing, and other matters. Another important success that is aligned with a CEOS strategic goal is the establishment of good communication with external organizations and communities to ensure mutual understanding of needs, requirements, and capabilities.

Internally, the creation of the SIT, the establishment of the Virtual Constellations, the creation of the EO Handbook, the Data Democracy initiative, and the technical achievements of WGISS and WGCV are viewed as important successes. The Forest Carbon Initiative is widely viewed as a current success, as is the focus on climate, culminating in the recent creation of the Working Group on Climate. Respondents noted that the CEOS environment has facilitated the creation of these activities, but warned that creation is easy relative to the investment required to sustain them, and that the real test may lie there.

Looking to the outside world, past leaders are nearly unanimous in pointing to the initiation of IGOS (and the side benefits of organizing the customers, including the formal recognition of the role of Affiliates and Associates with the creation of IGOS-P); the response of CEOS to GCOS (including the resulting drive toward coherence among users to provide consistent sets of requirements); and CEOS's reinvention of itself to work toward GEO goals and in support of the GEO work plan. Respondents highlighted the fact that CEOS's existence was fundamental to the successful creation of GEO and they value this accomplishment, while also acknowledging that GEO (and the CEOS relationship with GEO) still requires a lot of work.

FINDING: *CEOS has had significant successes both internally and externally, including its role in coordination among space agencies, the creation of IGOS and GEO, its response to GCOS, and in the Virtual Constellations, high-performing Working Groups, and recent initiatives in forest carbon and data democracy; sustaining these relationships and organizations may present challenges.*

RECOMMENDATION: The achievements that past leaders point to as CEOS major successes all speak directly to CEOS strategic objectives. Use the same lens as part of any process for selecting and shaping future activities.

RECOMMENDATION: At present, the role of CEOS in important early developments in space-based Earth observations is not well recorded and not understood outside CEOS. Many in the first generation of CEOS leaders have retired or will do so soon. CEOS may wish to consider recording some of this information, both as an historical document and as a formal record of the organization's origins and early development.

What new initiatives should CEOS undertake in the next 3-5 years?

The overwhelming consensus regarding new initiatives is that CEOS must do two things: 1) decide upon the means by which new initiatives are selected; and 2) meet the commitments that have already been made.

There is clear concern that CEOS has made many commitments, including some that are established and others that are fairly new but regarded already as successes, and it is perceived that important activities like forest carbon, data democracy, climate change and climate architecture must not be compromised by a CEOS that is stretched too thin by competing demands. The call for a reliable process for selecting new initiatives arises partly from this concern and partly from the need to select rationally and wisely from among the many good ideas and externally-derived tasks and requirements that CEOS is being asked to handle.

It is striking that, when asked what new things CEOS should do, the nearly unanimous response is one of caution. Superimposed upon this broad concern that CEOS needs to be strategic and thoughtful in its choices,

though, one new theme was in fact offered for consideration. Several respondents highlighted the societal importance of hazards and disaster monitoring and response, the need for predictive tools and coordination with the UN framework, and the extremely high value that space-based Earth observations bring to this area.

FINDING: *As also seen in the finding regarding objectives on the preceding page, the overwhelming consensus regarding new initiatives is that CEOS must do two things: 1) decide upon the means by which new initiatives are selected; and 2) meet the commitments that have already been made.*

RECOMMENDATION: CEOS should develop and implement a process for selecting new activities and tasks. The process should be cognizant of potential scope creep, and should include an assessment of whether a proposed activity is supportive of CEOS objectives, whether there are appropriate resources for the activity, how CEOS will adjudicate among multiple good proposed activities, and how decisions on new activities will be taken.

RECOMMENDATION: CEOS must meet the commitments that have already been made and ensure that current activities have both sufficient guidance and sufficient autonomy to succeed.

FINDING: *Hazards and disaster monitoring and response are an area offered for consideration as a new CEOS initiative. Space-based Earth observations bring extremely high value to this area of societal benefit.*

RECOMMENDATION: Once a process for deciding on new activities exists, evaluate whether hazards and disaster monitoring/response should constitute a new CEOS initiative.

Are there opportunities for CEOS to improve its structure, functioning, and portfolio of activities?

There is consensus that CEOS's structure and organizational functioning need improvement. Common issues articulated included aspects of structure and governance, participation, and better use of existing human resources in the working groups and virtual constellations.

The most frequently-mentioned issues of CEOS structure and governance are 1) the lack of established process for decision making and selection of new activities; 2) confusion regarding leadership structure and responsibilities; and 3) the sense that the overall structure of CEOS has become extremely complicated and difficult to navigate, with two governing bodies, working groups, virtual constellations, and societal benefit areas, the connections among which are not clearly defined or managed.

The need for a process for decision-making was emphasized once again in past leaders' responses to questions regarding CEOS structure, functioning, and portfolio of activities. That this issue was raised by multiple individuals, at multiple points in the interview process, highlights its importance to CEOS's future development. Please refer to the preceding section of this Annex for findings and recommendations from past CEOS leaders regarding this subject.

There is general confusion regarding lines of authority, leadership and divisions of responsibilities among the CEOS Chair, the SIT Chair, the CEO, DCEO, and Executive Secretariat. There is a sense that the leadership structure of CEOS has become more complex as the organization has become more complex, in response to the need to manage external requirements while maintaining its internal goals. This is not uncommon as organizations grow, but it is cumbersome, and leads to confusion regarding decision-making and prioritization. It would be appropriate for CEOS to explicitly identify the organizational functions that it now needs, and to consider what structural elements would be required to support those functions.

There is consensus that real technical coordination remains highly valuable. This function occurs predominantly through the Working Groups, Virtual Constellations, and SBAs, and the data strongly suggest that these need to be better utilized and empowered by the CEOS SEC and SIT. Multiple respondents suggested that better use be made of these groups, and that CEOS would benefit from delegating

responsibilities and authority to them, giving them both better guidance and more authority over their areas of expertise. Another point raised is that the Virtual Constellation concept has been widening, and now includes not only satellite constellations that need coordination, but also broad communities of practice. This represents a broadening of the original virtual constellation concept and it is not clear that the overall size or shape of the set has been considered.

The data strongly suggest that there is a lack of common understanding regarding the roles, activities, and performance of the Societal Benefit Areas as distinct from other structural components of the organization, to the extent that different individuals shared very different perceptions regarding the number of SBAs, as well as their size, status (active, moribund, or never created), and leadership, and whether they should be continued.

In overall terms, while looking for documentation regarding the various subgroups within CEOS, it was observed that some key CEOS structural components do not have defining terms of reference, or that these are out of date and do not reflect the changes that have occurred in response to the organizational demands placed upon CEOS by external organizations like GEO.

Several concerns were articulated regarding member participation in CEOS. It is widely noted that many Associate and Affiliate members who formerly were active no longer attend CEOS meetings; it is often stated that this is because these organizations are now within GEO and GEO comes to the table for all, but this appears to be an assertion that has not yet been validated through discussion or correspondence with formerly-active full members, associates or affiliates. Respondents also expressed the need for CEOS to turn more attention to other partners beside GEO. GCOS and UNFCCC were mentioned multiple times as partner organizations with high mutual value and visibility for CEOS.

Some respondents also expressed a desire to evaluate the balance of R&D versus operational agencies, to reinvigorate the CEOS goal of space agency coordination in order to encourage active participation by more members, and to explore how to give smaller agencies more of a role.

Frustration was expressed over the format of CEOS meetings, the chief complaint being that the meetings are dominated by reporting and review of tasks at the expense of discussion, coordination, and decision making, and that they contain repetitive material. Respondents expressed a strong desire to see CEOS actions receive an investment of time, tracking and measurement of progress that is in balance with the investment given to CEOS-GEO actions.

FINDING: *As also seen in the findings for preceding sections, CEOS lacks a process for decision-making and selection of new activities.*

RECOMMENDATION: CEOS should develop and implement a process for selecting new activities and tasks. The process should be cognizant of potential scope creep, and should include an assessment of whether a proposed activity is supportive of CEOS objectives, whether there are appropriate resources for the activity, how CEOS will adjudicate among multiple good proposed activities, and how decisions on new activities will be taken.

FINDING: *There is confusion within CEOS regarding the complex leadership structure, with a lack of clarity regarding the respective roles, responsibilities and authorities of the CEOS Chair, SIT Chair, CEO, DCEO, and Executive Secretariat.*

FINDING: *The overall structure of CEOS has become extremely complicated and difficult to navigate, with two governing bodies, working groups, virtual constellations, and societal benefit areas, the connections among which are not clearly defined or managed.*

RECOMMENDATION: CEOS should articulate the organizational functions and relationships that it needs in order to perform and sustain its work, and modify the leadership structure, organizational elements, and

connections as needed to support these functions. Terms of Reference should be created and/or updated and made accessible so that CEOS participants have a common understanding of these roles and responsibilities.

FINDING: *Participation in CEOS meetings by a number of full, affiliate and associate members has declined, and while there is anecdotal evidence that attributes this to participation in GEO, there is a paucity of evidence to confirm this assertion.*

RECOMMENDATION: As a follow-on to this Self Study, CEOS should reach out to affiliate and associate members and survey them to understand their reasons for no longer participating in CEOS. If there are non-participating space agencies, these should be included in the follow-on.

FINDING: *There is frustration that CEOS meetings are repetitive dominated by reporting and review of routine task progress at the expense of discussion, coordination, and decision-making.*

RECOMMENDATION: Consider developing a unified meeting plan, in which the scope, format, and purpose of the CEOS Plenary and SIT meetings for the entire year are developed. Better define what needs to be addressed at SIT & Plenary meetings to create a complementary rather than repetitive structure, and revise the format of major meetings to reduce repetition and reporting and to facilitate discussion and decision making.

Annex 5: List of Interviewees and Questions Used in Interviews

The following individuals kindly consented to be interviewed as part of the CEOS Self Study. They provided much valuable insight, perspective and information, and we offer our sincere thanks for their participation.

Post-2005 CEOS Leaders

Briggs, Stephen (ESA)
Camara, Gilberto (INPE)
Dowreang, Darasri (GISTDA)
Homma, Masanori (JAXA)
Horikawa, Yasushi (JAXA)
Kicza, Mary (NOAA)
Liebig, Volker (ESA)
Maruping, Pontsho (CSIR)
Ryan, Barbara (then USGS, now WMO)
Varotto, Conrado (CONAE)

Past CEOS Leaders (Key Secretariat Roles)

Ishida, Chu (JAXA)
Shaffer, Lisa (NASA)
Duchossois, Guy (ESA)

Past CEOS Leader, 1996-2005 timeframe

Withee, Greg (NOAA & USGS)
Furuhama, Yoji (JAXA)
Mohr, Tillmann (EUMETSAT)
Fellous, Jean-Louis (CNES/ESA)
Brachet, Gerard (CNES)
Embleton, Brian (CSIRO)

Interview Questions for Pre-2005 CEOS Leaders

Committee on Earth Observation Satellites (CEOS) Self Study

In February 2011, the incoming CEOS SIT Chair (Dr. Michael Freilich, NASA) proposed that CEOS conduct a "self study" to identify past successes, strengths, opportunities, challenges, and future initiatives. The idea was welcomed by CEOS leadership and a Steering Committee was formed to lead the process, prepare a report, and present the findings at the CEOS Plenary in November, 2011.

The goal of the study is to inform CEOS as it goes forward, through an analysis of lessons learned, input from past leaders, assessment of current CEOS interaction with customers and other organizations, and recommendations for potential changes and potential new initiatives for the next 5-7 years.

The operating framework of the CEOS Self Study includes the Steering Committee and three Study Teams that are focusing on CEOS Executive Functions, Working Groups and SBAs, and Constellations, respectively. The analytic approach is to review and assess CEOS products and documents and to broadly canvass the CEOS community, CEOS stakeholders, and past CEOS leaders for their valuable perspectives, ideas, and input.

The main output of the study will be a final report rendered by the Steering Committee that will analyze the input from the Study Teams and make recommendations for consideration by CEOS leadership. The final report will identify CEOS's strengths, main challenges going forward, and strongest opportunities for new initiatives and activities in the coming years. To develop the final report, the Steering Committee will draw on the full range of sources described in the paragraph above to extract common themes and to highlight emerging issues and opportunities.

It is important to note that the final report will be a synthesis, not a compendium of material submitted by individuals. The report will fully and fairly incorporate the major issues and themes that are identified by past CEOS leaders as well as other sources of input. Since the report will provide a fusion of information derived from multiple sources, particular concerns or issues will not be attributed to specific individuals. In addition, please note that the interviews themselves will not be included verbatim in the Report. Recommendations contained in the report will be the product of the Steering Committee.

In such cases where a direct quote is deemed to be of particular importance and value to the report, the Steering Committee may seek the permission of the originating individual to include the quote. The Steering Committee will not reproduce direct quotes or attributed material from any individual without the originator's express written permission.

This report will be for internal distribution only; it will not be distributed outside CEOS agencies. However, the intent is to publish an Executive Summary of the self study for distribution outside CEOS, summarizing key points and recommendations for potential changes and new initiatives.

Interview Questions

Background for Questions 1 and 2: CEOS coordinates civil space-borne observations of the Earth. Participating agencies strive to address critical scientific questions and to plan satellite missions without unnecessary overlap. CEOS currently has three primary objectives in pursuing this goal: (1) To optimize benefits of space-borne Earth observations through cooperation of its Members in mission planning and in development of compatible data products, formats, services, applications and policies; (2) To serve as a focal point for international coordination of space-related Earth observation activities; and (3) To exchange policy and technical information to encourage complementarity and compatibility of observation and data exchange systems.

Question 1: What was the perception of CEOS objectives at the time you were involved? Were these objectives formally stated?

Question 2: Can you make any statements about the achievement of these objectives and the way the achievement was assessed?

Background for Questions 3, 4 and 5: CEOS was established in September 1984 under the aegis of the G7 Economic Summit of Industrialized Nations, Working Group on Growth, Technology and Employment. Since that time, CEOS has undergone significant change and added numerous functional groups. The current organization includes 49 Members and Associates, a Strategic Implementation Team (SIT), four Working Groups and six Constellation Teams. Please refer to the CEOS Major Milestones and Turning Points (attached) for additional information.

Question 3: CEOS membership has changed through the years, and CEOS now includes more structural components and activities than before. Have you followed the evolution of CEOS in the last ten years? If yes, how would you express the difference with respect to earlier periods?

Question 4: In the course of its evolution, CEOS has become a recognized contributor, on behalf of the space agencies, to international endeavors like GEO, GCOS, UNFCCC and more. Based on your experience, would you recommend this outward trend be expanded, or do you recommend that CEOS be primarily an instrument of dialogue among space agencies on Earth Observation technical matters?

Question 5: Based upon your experience, how do you see the relation between CEOS and other coordination mechanisms, for example, CGMS or IOCCG?

Background for Questions 6, 7, 8, 9 and 10: The self study is aimed at understanding CEOS's near opportunities for improvement as well as its successes, and to identify potential changes that might be needed, as well as potential new initiatives.

Question 6: What do you see as CEOS's most important successes and/or accomplishments over the course of its history?

Question 7: Recently, most of the contributions of CEOS agencies to international initiatives are linked to issues related to climate and environment. Do you see other key themes on which to focus our attention?

Question 8: Are there any other points or issues you would like the Self Study team to address or consider?

Thank you very much for providing input to this important study.

Interview Questions for Post-2005 CEOS Leaders

Committee on Earth Observation Satellites (CEOS) Self-Study

In February 2011, the incoming CEOS SIT Chair (Dr. Michael Freilich, NASA) proposed that CEOS conduct a "self-study" to identify past successes, strengths, opportunities, challenges, and future initiatives. The idea was welcomed by CEOS leadership and a Steering Committee was formed to lead the process, prepare a report, and present the findings at the CEOS Plenary in November, 2011.

The goal of the study is to inform CEOS as it goes forward, through an analysis of lessons learned, input from past leaders, assessment of current CEOS interaction with customers and other organizations, and recommendations for potential changes and potential new initiatives for the next 5-7 years.

The operating framework of the CEOS Self-Study includes the Steering Committee and three Study Teams that are focusing on CEOS Executive Functions, Working Groups and SBAs, and Constellations, respectively. The analytic approach is to review and assess CEOS products and documents and to broadly canvass the CEOS community, CEOS stakeholders, and past CEOS leaders for their valuable perspectives, ideas, and input.

The main output of the study will be a final report rendered by the Steering Committee that will analyze the input from the Study Teams and make recommendations for consideration by CEOS leadership. The final report will identify CEOS's strengths, main challenges going forward, and strongest opportunities for new initiatives and activities in the coming years. To develop the final report, the Steering Committee will draw on the full range of sources described in the paragraph above to extract common themes and to highlight emerging issues and opportunities.

It is important to note that the final report will be a synthesis, not a compendium of material submitted by individuals. The report will fully and fairly incorporate the major issues and themes that are identified by past CEOS leaders as well as other sources of input. Since the report will provide a fusion of information derived from multiple sources, particular concerns or issues will not be attributed to specific individuals. In addition, please note that the interviews themselves will not be included verbatim in the Report. Recommendations contained in the report will be the product of the Steering Committee.

In such cases where a direct quote is deemed to be of particular importance and value to the report, the Steering Committee may seek the permission of the originating individual to include the quote. The Steering Committee will not reproduce direct quotes or attributed material from any individual without the originator's express written permission.

This report will be for internal distribution only; it will not be distributed outside CEOS agencies. However, the intent is to publish an Executive Summary of the self-study for distribution outside CEOS, summarizing key points and recommendations for potential changes and new initiatives.

Interview Questions

Background for Questions 1 & 2: CEOS coordinates civil space-borne observations of the Earth. Participating agencies strive to address critical scientific questions and to plan satellite missions without unnecessary overlap. CEOS has three primary objectives in pursuing this goal: (1) To optimize benefits of space-borne Earth observations through cooperation of its Members in mission planning and in development of compatible data products, formats, services, applications and policies; (2) To serve as a focal point for international coordination of space-related Earth observation activities; and (3) To exchange policy and technical information to encourage complementarity and compatibility of observation and data exchange systems.

Question 1: Does CEOS have clearly-defined objectives and do you believe these objectives have been met in the past or are being met now ?

Question 2: Are CEOS's objectives consistent with the available resources (human, physical, fiscal, and informational) ?

Background for Question 3: CEOS currently manages its own website (www.ceos.org), produces a bi-yearly newsletter, produces an annual work plan with identified objectives and expected outcomes, and tracks an annual list of critical actions linked to GEO. All of these products are aimed at measuring and documenting CEOS progress towards its goal of addressing critical questions and planning satellite missions without unnecessary overlap.

Question 3: How did CEOS measure and document its progress toward goals in the past and do you view the current process as effective ?

Background for Questions 4, 5, 6, 7, and 8: CEOS was established in September 1984 under the aegis of the G7 Economic Summit of Industrial Nations, Working Group on Growth, Technology and Employment. Since that time, CEOS has undergone significant change and added numerous functional groups. These include the Strategic Implementation Team (SIT), several Working Groups and several Constellation Teams. Please refer to the CEOS Major Milestones and Turning Points (Attached) for additional information. The self study is aimed at understanding CEOS's near opportunities for improvement as well as its successes, and to identify potential changes that might be needed, as well as potential new initiatives.

Question 4: What do you see as CEOS's most important successes and/or accomplishments over the course of its history to date ?

Question 5: What are the most important new initiatives for CEOS to set for the next 3-5 years ?

Question 6: What are the most important opportunities for CEOS to improve its structure, scope, number of activities, or any other factors over the next 3-5 years ?

Question 7: Are there any activities CEOS is currently undertaking that no longer provide value to the organization and should thus be ceased ?

Question 8: What other points or issues would you suggest the Self-Study team address or consider ?

Thank you very much for providing input to this important study.