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# Introduction and Overview

The *2014 CEOS Work Plan* has been developed by the CEOS Executive Officer (CEO) and the CEOS Chair (European Organisation for the Exploitation of Meteorological Satellites [EUMETSAT]), in consultation with the CEOS Strategic Implementation Team Chair (Centre National d’Études Spatiales [CNES]), CEOS Secretariat, CEOS Working Groups, CEOS Virtual Constellations, CEOS Ad Hoc Teams, the CEOS membership at large, and CEOS’s external stakeholders. The purpose of this document is to set forth near-term objectives and deliverables designed to achieve the goals outlined in the *CEOS Strategic Guidance* document. It includes a description of CEOS activities to be executed in the current calendar year (2014), and summarizes anticipated activities for the subsequent two years (2015-2016). Detailed information, including planned milestones and deliverables, accomplishments, and issues, is available and routinely updated in the CEOS Action Tracking System. This Work Plan will be revised annually; however, the priorities and activities outlined herein are expected to remain fairly consistent from year to year. Therefore, this Work Plan is likely to need only minor revisions each year, as current activities are completed, planned activities are executed, and new initiatives are projected.

**CEOS Mission Statement:**

**CEOS ensures international coordination of civil space-based Earth observation programs and promotes exchange of data to optimize societal benefit and inform decision making for securing a prosperous and sustainable future for humankind.**

To this end, CEOS’s primary objectives are:

* To optimize the benefits of space-based Earth observation through cooperation of CEOS Agencies in mission planning and in the development of compatible data products, formats, services, applications and policies
* To aid both CEOS Agencies and the international user community by, among other things, serving as the focal point for international coordination of space-based Earth observation activities, including the Group on Earth Observations and entities related to global change
* To exchange policy and technical information to encourage complementarity and compatibility among space-based Earth observation systems currently in service or development, and the data received from them, as well as address issues of common interest across the spectrum of Earth observation satellite missions

Achievement of these three objectives requires significant internal, interagency coordination, and external consultation and coordination of outputs to respond to the needs of key stakeholders. These stakeholders consist of national governments, including the Group of Eight (G8) and the Group of 20 (G20) Industrialized Nations, the intergovernmental Group on Earth Observations (GEO), and organizations participating in treaties and global programs affiliated with the United Nations (UN)[[1]](#footnote-1). CEOS works closely with these stakeholders and their constituent organizations to achieve common objectives.

# CEOS Priorities

As decided at the 2013 CEOS Plenary meeting in Montreal, Canada, CEOS Agencies will continue to enhance their cooperation to respond effectively to Earth observation users’ needs by achieving integration across the full range of Earth observations, by closing important observational gaps, and by promoting the sharing of CEOS Agency data, and improving access to and use of such data. CEOS will support more effective societal decision making in the areas of climate monitoring and research; carbon observations, including observations to support the effective monitoring and management of the world’s forested regions; food security; disaster risk management; biodiversity; capacity building; and data availability and access. CEOS Working Groups and Virtual Constellations will expand their technical and scientific coordination to support these priorities, and improve the overall level of complementarity and compatibility of their Earth observation and data management systems for societal benefit. CEOS will consider other requests from external stakeholders and determine what, if any, support is possible and appropriate. CEOS will also continue its outreach and communications efforts. As it executes these activities, CEOS will operate in accordance with the guidance provided in the *CEOS Governance and Processes* document regarding the organization’s structure, processes, and stakeholder relations.

CEOS’s internal and external coordination involves a considerable number of tasks supported by the full range of CEOS participants. This document is intended to provide overall guidance for CEOS on expected outcomes for CEOS and its stakeholders for 2014-2016. For 2014, the plan addresses CEOS initiatives at a general level. Specific details regarding support required to achieve these outcomes will be maintained by the respective responsible CEOS entities (e.g., CEOS Agencies, Working Groups, Virtual Constellations, Ad Hoc Teams), and reported as appropriate via updates to the online CEOS Action Tracking System (located at http://ceos-actions.com ).

For subsequent years (2015-2016) this document summarizes planned CEOS activities more broadly; details regarding these future activities will be established in forthcoming updates of this document, as the activities near implementation. It is understood that the Virtual Constellations, Working Groups, and Ad Hoc Teams will prepare separate, more detailed Work Plans that complement this overall guiding Work Plan.

# Expected Outcomes for 2014-2016

The expected outcomes for 2014-2016 reflect the ongoing and emerging priorities of CEOS, as reflected in its internal decision making and its external commitments. They are intended to focus on improved Earth observation (EO) systems coordination and enhanced data access for key global programs and initiatives.

The main outcomes are described for the following thematic areas for the period 2014-2016:

1. Climate Monitoring, Research, and Services
2. Carbon Observations, Including Forested Regions
3. Observations for Agriculture
4. Observations for Disasters
5. Capacity Building, Data Access, Availability and Quality
6. Advancement of the CEOS Virtual Constellations
7. Outreach to Key Stakeholders
8. Support to Other Key Stakeholder Initiatives
9. Organizational Issues

The outcomes for each thematic area are summarized in tables that list the objectives/deliverables, including projected completion dates (indicated by quarters of the calendar year), background information, and responsible CEOS entities.

CEOS operates on a best-efforts basis. Responsible CEOS entities are expected to accomplish the objectives and deliverables identified in this document to the best of their abilities, but there is no formal commitment and no repercussion if an objective or deliverable is not accomplished by the projected completion date.

## Climate Monitoring, Research, and Services

* 1. **Coordinate development of** **Climate Data Records (CDRs) and related datasets addressing Essential Climate Variables (ECVs) established by the Global Climate Observing System (GCOS).**

**2014-2016:** Through the CEOS-CGMS Working Group on Climate (WGClimate), CEOS Agencies will complete the first version of the ECV inventory. This inventory will then form the basis for a gap analysis and the subsequent development of a coordinated action plan to address the identified gaps and opportunities. Guidelines for ECV assessments of both process and scientific metrics will also be developed to support the gap analysis and subsequent development of the action plan. The ECV assessment guidelines will be applied in collaboration with the CEOS Virtual Constellations.

Once a first version of the ECV inventory, gap analysis and action plan have been delivered, the ECV inventory will be further developed with additional records, leading to new versions of the gap analysis and associated action plan to further optimize ECV coverage and depth. This update cycle is anticipated to start in the second half of the three-year period. Linkages will also be put in place between the ECV Inventory and the *GCOS Implementation Plan 2010* reporting. In addition, an effort is underway to collaborate with the in situ community.

* 1. **Continue cooperation with GEO, GCOS, the World Meteorological Organization (WMO), and the Coordination Group for Meteorological Satellites (CGMS) in the development of a space-based system to support climate information and adaptation.**

**2014-2016:** CEOS Agencies will continue to cooperate with GEO, GCOS, WMO, and CGMS by implementing Agency actions to achieve the socio-economic benefits described in the CEOS-CGMS-WMO *Strategy Towards an Architecture for Climate Monitoring from Space*, with emphasis on the strategy’s Applications and Decision-Making pillars. CEOS will consider how to address and contribute to the WMO’s Global Framework for Climate Services (GFCS). CEOS will also broaden CEOS/CGMS reporting to the UNFCCC Subsidiary Body for Scientific and Technological Advice-Research and Systematic Observation (SBSTA-RSO) in collaboration with GCOS. This reporting should include not only CEOS and CGMS support to the GCOS implementation plan, but also CEOS contributions to GFOI and Carbon Strategy, together with any relevant CGMS-specific contributions.

Completion of the ECV inventory, gap analysis, and action plan will allow CEOS to provide continuous feedback to climate monitoring and research efforts. These actions will allow CEOS to be prepared to respond to the GCOS Adequacy Report/Satellite Supplement (or equivalent), when published by GCOS.

| **Climate Monitoring, Research, and Services Objectives/Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| **CMRS-1**: ECV inventory (first version) | Q2 2014 | The ECV inventory provides the foundation for the fulfillment of the three main objectives assigned to the Joint Working Group. At the 1st meeting of the Joint Working Group in March 2014, the current status of the inventory will be reviewed in the three domains (land, ocean and atmosphere) and the actions needed to achieve "Version 1" status of the inventory will be identified. | WGClimate with support from VCs |
| **CMRS-2**: Gap analysis (first version) | Q4 2014 | Also, at the 1st meeting of the Joint Working Group, the reference process will be defined for the gap analysis (including guidelines for ECV assessments), together with the necessary tools to support the implementation of this process. The gap analysis activities will commence once: a) Version 1 of the ECV inventory is available, and b) the reference process for the gap analysis and supporting tools are available. | WGClimate with support from VCs |
| **CMRS-3**: Action plan (first version) | Q1 2015 | Once the gap analysis has been completed, a coordinated action plan will be developed to:   * Create the conditions for delivering further climate data records from existing observational data by targeting processing gaps/shortfalls/opportunities (e.g., cross-calibration, reprocessing) * Optimize the planning of future satellite missions and constellations to expand existing and planned climate data records, in terms of both coverage and record length, and to address gaps with respect to GCOS requirements | WGClimate with support from VCs |
| **CMRS-4:** Case studies linking CDRs to societal applications and informed policy decisions | Q1 2015 | In order to provide a connection between the availability of climate data records and the socio-economic benefits that could accrue, particularly from a policy-making perspective, case studies will be performed to characterize the link between the *capability to make informed policy decisions* and the *availability of climate data record information*. These case studies will make use of the climate monitoring architecture and are expected to involve drilling down within the Applications and Decision-making pillars of the architecture. One of the case studies will be in an application area of the Global Framework for Climate Services (GFCS)—see CMRS-5. | WGClimate |
| **CMRS-5**: Contributions to the Global Framework for Climate Services (GFCS) | Q4 2014 | The Joint Working Group will examine the most effective means of contributing to the GFCS from the viewpoints of: a) ensuring adequate representation of the capabilities and plans of CEOS and CGMS agencies, as represented by the ECV inventory, gap analyses and action plan, and b) formalization of the relationship between the GFCS and the Joint Working Group, including possible GFCS representation in working group meetings. | WGClimate |
| **CMRS-6**: Report to UNFCCC Subsidiary Body for Scientific and Technological Advice-Research and Systematic Observation (SBSTA-RSO) | Q4 2014 | This report will address CEOS and CGMS support to the GCOS implementation plan, as well as CEOS contributions to GFOI and Carbon Strategy. In addition, relevant CGMS-specific activities may also be included. | WGClimate with support from GFOI, and CTF |
| **CMRS-7**: Incorporation of in situdata holdings within the ECV inventory | Q4 2015 | In order to extend the benefits of the infrastructure of the ECV inventory to climate-relevant in situ data holdings, in January 2013 it was agreed to assess the feasibility of incorporating such information within the scope of the ECV inventory. At the 1st meeting of the Joint Working Group progress on this objective will be assessed. | WGClimate |
| **CMRS-8**: Update of ECV inventory, gap analysis and action plan (version 2) | Q2 2015 to Q4 2016 | Once the first full cycle has been completed (see CMRS-1 to CMRS-3), resulting in Version 1 of the ECV inventory, gap analysis and action plan, a new cycle will be triggered by the availability of an updated ECV inventory, leading to Version 2 of these deliverables. | WGClimate with support from VCs |

## Carbon Observations, Including Forested Regions

* 1. **Coordinate space-based observations to support the effective monitoring and management of the world’s forested regions to support any future international climate agreement and support the Space Data Component of the GEO Global Forest Observations Initiative (GFOI).**

**2014:** Through its Ad Hoc Space Data Coordination Group (SDCG) for GFOI, CEOS is developing and coordinating the implementation of strategies for the provision of satellite observations in support of the development of national forest monitoring and measurement, reporting, and verification (MRV) systems. At SIT-29, the SDCG will seek endorsement of the second element of the *CEOS Strategy for Space Data Coverage and Continuity in Support of GFOI* (agreed at the 25th CEOS Plenary in 2011), referred to as the *Space Data Services Strategy for GFOI. The Space Data Strategy for GFOI* seeks to provide a coordinated strategy for national data acquisition that will accommodate countries that have specific technical requirements or heritage and experience on working with a particular EO data source or type. If endorsed, the SDCG will work with a small number of countries (3-4) to develop pilot services during 2014.

The SDCG will continue to implement the *Global Baseline Acquisition Strategy* and at SIT-29, will seek endorsement of the 2014 update the *Strategy* to reflect new data stream availability. The SDCG will develop the Space Data Services Strategy and implementation plan for 2014. A 2013 implementation report on global acquisitions will also be presented at SIT-29.

**2015-2016:** The SDCG will deliver annual implementation updates for the *Global Baseline Acquisition Strategy* and the *Space Data Services Strategy* at the annual SIT meetings. The SDCG will continue to coordinate expanded coverage of the *Global Baseline Acquisition Strategy*, culminating in global coverage in the 2016-2017 timeframe.

The SDCG will develop a strategy document for the supply of data in support of GFOI R&D activities – the third element of the *CEOS Strategy for GFOI.* It is expected that CEOS endorsement of this document will be sought at SIT-30 in 2015.

* 1. **Publish the *CEOS Strategy for Carbon Observations from Space* and determine how CEOS can best implement the strategy.**

**2014:** The CEOS Carbon Task Force (CTF) has provided CEOS Agency representation in the development of the GEO Carbon Strategy Report and the establishment of the GEO Carbon Community of Practice (CoP). One of the first actions of the CoP was to develop the GEO Carbon Strategy, which is a defining document for the GEO and carbon science communities. The CTF will publish the *CEOS Strategy for Carbon Observations from Space* in response to the GEO Carbon Strategy. The CEOS strategy addresses the three domains—atmospheric, oceanic and terrestrial—and their interfaces, and has identified a number of actions to be completed by space agencies.

CEOS participants at SIT-29 will discuss the best approach for oversight of implementation of the actions. The success of the process of managing the actions resulting from the CEOS Response to the GCOS Implementation Plan can serve as a model for the Carbon Strategy approach. Further, it has been suggested that the biannual report to UNFCCC by CEOS in updating its GCOS Response could feature a ‘Carbon Supplement’ based on progress towards the Carbon Strategy actions. This would ensure a significance and relevance to the implementation process going forward.

**2015-2016:** CEOS will continue to track the status of the actions identified in the *CEOS Strategy for Carbon Observations from Space*.

| **Carbon Observations, Including Forested Regions Objectives/Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| **CARB-1**: Updated Global Baseline Acquisition Strategy for GFOI | Q4 2014 | A baseline, coordinated global data acquisition strategy for GFOI was endorsed by CEOS in 2013. This strategy, also known as “Element-1,” utilizes freely available core data streams for global, systematic and sustained wall-to-wall acquisitions of forested areas. An update to this plan to reflect the addition of new data streams and annual implementation changes will be presented for endorsement at SIT-29. The SDCG will continue to coordinate the implementation of the *Strategy* and to report annually to SIT. | SDCG for GFOI |
| **CARB-2**: Initial version of Space Data Services Strategy for GFOI | Q2 2014 | GFOI will develop a coordinated strategy for national space data services, also known as “Element-2,” aiming to provide a coordinated strategy for national data acquisitions. The first version of this *Strategy* will be presented for endorsement at SIT-29. The SDCG will coordinate the initial implementation of the *Strategy*, and will report to SIT. | SDCG for GFOI |
| **CARB-3:** Strategy on supply of data in support of GFOI R&D activities | Q2 2015 | At the SDCG-5 meeting in 2014, it was decided that a strategy was required for the third element of the Space Data Component for GFOI and that endorsement should be sought at SIT-30. | SDCG for GFOI |
| **CARB-4:** CEOS delivery of coordinated land surface observations for GFOI countries | Q4 2014 | Support the delivery of a Data Services Pilot Project for Kenya, which will be developed by GFOI; the pilot will test data storage, processing, and archive search/discovery tools. | SDCG for GFOI |
| **CARB-5**: Updated Baseline Global Data Acquisition Strategy for GFOI and Space Data Services Strategy for GFOI | Q4 2015 | Element-1 (data acquisition strategy) and Element-2 (data services) will require annual updates to reflect changes in space data assets and national implementation plans. It is expected that GFOI will reach full operational status in 2016-2017. | SDCG for GFOI |
| **CARB-6** Endorsed*CEOS Strategy for Carbon Observations from Space* | Q2 2014 | The *CEOS Strategy for Carbon Observations from Space* has been under development for two years and is currently undergoing final revisions to ensure the strategy has feasible and executable actions identified. | CTF |
| **CARB-7:** Implementation options for the *CEOS Strategy for Carbon Observations from Space* | Q2 2014 | Ensure a focused, comprehensive preparation of the discussion on implementation of the CEOS Carbon Strategy at SIT-29. | CTF |
| **CARB-8**: Implementation plan for carbon observations | Q4 2014 | A list of implementation options for the CEOS carbon strategy, including a recommended option, will be developed. | CTF+TBD |

## Observations for Agriculture

* 1. **Develop and implement a data acquisition strategy to provide satellite observations that will facilitate the monitoring of agricultural production in support of the GEO Global Agricultural Monitoring (GEOGLAM) initiative.**

**2014:** GEOGLAM aims to enhance agricultural production estimates through the use of Earth observations, and to address concerns raised by the G20 Agricultural Ministers about market volatility for the world’s major crops. Through its Ad Hoc Working Group on GEOGLAM, CEOS has developed, and continues to coordinate the implementation of strategies for the provision of satellite observations to the GEOGLAM. The GEOGLAM Implementation Plan utilizes a phased approach to expand its efforts over a growing list of countries, increase the scope of the program, add datasets, and build capacity toward an operational program in ~2017.

The CEOS Ad Hoc Working Group on GEOGLAM will provide an update on CEOS support to GEOGLAM Phase 1 implementation at SIT-29. The Ad Hoc Working Group will also submit an updated strategy for endorsement at CEOS Plenary in October 2014, in part addressing the potential for CEOS support to GEOGLAM Phase 2, depending on the maturity of the GEOGLAM Implementation Plan and resources for Phase 2. GEOGLAM is expected to update its Implementation Plan in late 2014/early 2015.

The CEOS Ad Hoc Working Group on GEOGLAM will continue working with GEOGLAM to define their space data requirements, identify potential CEOS inputs, and track/report on the application of data provided by CEOS agencies. CEOS, through the SEO will be working with GEOGLAM (including Asia-RiCE) to define a number of prototypes for the Space Data Management System (SDMS).

The CEOS Ad hoc Working Group on GEOGLAM has also supported the CEOS-GEOGLAM Co-Community meeting during February 2014 and a date for a follow-up Co-Community meeting will be sought later in 2014.

**2015-2016:** GEOGLAM will continue to expand its efforts by increasing the number of supported countries, expanding its use of mission data by utilizing new mission datasets (i.e., optical and radar), continuing development of sampling strategies, and investigating methods for data management and distribution. The Ad Hoc Working Group on GEOGLAM will update the CEOS Acquisition Strategy for GEOGLAM to reflect the expansion of effort and changes to data supply arrangements.

* 1. **Continue support to the Joint Experiments on Crop Assessment and Monitoring (JECAM) initiative.**

**2014-2016:** JECAM was initiated in 2009 by the GEO Agriculture Monitoring Community of Practice (CoP) to enhance collaborative international research on agriculture through use of remotely-sensed EO. In 2011, CEOS initiated efforts to supply JECAM users with relevant remote sensing data through a coordinated EO data acquisition program involving CEOS Agencies and commercial data providers. CEOS Agencies will continue data acquisitions for support to JECAM research at selected sites for both Northern Hemisphere and Southern Hemisphere growing seasons. It is expected that these acquisitions will continue at least through the end of 2016, and be described in an annual report. CEOS Agencies will continue to liaise with the JECAM Project Office as it continues its research and development support for the GEO/G20 Global Agricultural Monitoring (GEOGLAM) initiative.

| **Observations for Agriculture Objectives/Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| **AGRI-1**: Updated Acquisition Strategy for GEOGLAM | Q4 2014 | The CEOS Data Acquisition Strategy for GEOGLAM Phase 1 spans the 2012-2014 timeframe and focuses on foundation activities, building on existing activities and pilot projects for a small number of countries, and scoping the program for future phases. Updates to this document include the addition of new mission datasets, updates to sampling approaches, adjustments to the Strategy that improve GEOGLAM coverage, and updates to country coverage. The updated Strategy will be presented for endorsement at CEOS Plenary in October. An implementation update on the Strategy will also be provided at SIT-29. | Ad Hoc Working Group on GEOGLAM |
| **AGRI-2:** JECAM Annual Report | Q4 2016 | During the Phase-1 period, GEOGLAM will allow JECAM to develop and operationalize its monitoring techniques, including sampling approaches; allow countries to build capacity to collect and process Earth observation data; and allow time to validate and incorporate results into decision-making processes. An annual report of the JECAM efforts will summarize the results of the project and its relevance to GEOGLAM. | Ad Hoc Working Group on GEOGLAM |

## Observations for Disasters

* 1. **Strengthen support to the disaster management community through the sustained coordination of disaster-related activities undertaken by CEOS Agencies.**

**2014:** CEOS Agencies, through the Working Group on Disasters (WGDisasters), will respond to the three Disaster Risk Management (DRM) Pilots (defined in the 2013 *CEOS Disaster Risk Management Observation Strategy*)—Floods, Seismic Hazards, and Volcanoes—by first identifying the specific EO requirements for each pilot, in close cooperation with representatives of the communities of users (stakeholders, scientists, civil protections, local authorities, resources management national authorities, etc.). Through WGDisasters, CEOS Agencies will provide data for other entities to develop new end products and services to better deliver flood-related information (Floods), map active faults at global scale (Seismic Hazards), and operationally monitor active volcanoes for large scale eruptions (Volcanoes). Both the Seismic Hazard and the Volcanoes pilots have objectives that are directly related to the on-going Geohazard Supersites and Natural Laboratories GEO initiative (see 3.4, Section III).CEOS representatives will maintain a close dialogue with GEO and UN experts to ensure appropriate recognition of the use of space-based EO within the *2015-2025 Post-Hyogo Framework for Action (HFA2)* (see 3.4, section II).

CEOS Agencies are also developing the concept of a Disaster Recovery Observatory, a one-time demonstration in the 2014-2016 period, that will allow the development of specific tools tailored to provide easy access to data over affected areas (pre-event data, response data and coordinated post event acquisitions). An organized repository, combined with an effective exploitation platform, will allow disaster managers to work in a known environment with advanced satellite products and promote use of these products to key user communities. The Disaster Recovery Observatory will make available as much geospatial data as possible for use in the immediate aftermath of a major disaster and for a number of years after the event. The WGDisasters will survey potential institutional donors to study the possible inclusion of additional hazards and the sustainability of the activities for 2016 onwards (e.g., operational hazard monitoring systems).

**2015-2016:** CEOS will continue DRM Pilots and Recovery Observatory activities until completion of the activities in 2016, producing concrete outcomes with advertised feedback from users collected continuously to better support space agencies’ requests to play an improved and critical role in DRM. Some of the activities to be conducted during this period will be related to capacity building.

* 1. **Ensure that the importance of Earth observations from space is emphasized at the UN 2015 World Conference on Disaster Risk Reduction and in the post-Hyogo Framework for Actions (HFA2).**

CEOS will also actively participate in the 2015 UN World Conference on Disaster Risk Reduction (WCDRR) and will closely cooperate with major stakeholders such as UN ISDR and Japanese officials involved in the preparation of the 2015 WCDRR.

**2014:** the 2015 WCDRR conference will be preceded by several preparatory meetings in 2014, on all continents. Those meetings aim at:

* Providing inputs for the generation of the HFA2 document that will define the major priorities in DRR for the period 2015-2025
* To start to collect the draft expression of commitments of the various DRR actors that will be consolidated / finalized at the occasion of the 2015 WCDRR.

**2015-2016:** CEOS will participate in the 2015 WCDRR conference and CEOS Agencies, coordinated through the WGDisasters, will work with the DRR communities and major stakeholders according to the priorities indicated in the HFA2.

* 1. **Continue support to the Geohazards Supersites and Natural Laboratories (GSNL) Initiative.**

**2014:** The Geohazards Supersites and Natural Laboratories (GSNL) Initiative aims to improve our knowledge of geophysical processes posing geohazards, with an initial focus on earthquakes and volcanoes. The effort is led by a global partnership of scientists, satellite and *in situ* data providers (multi-sensor interferometric synthetic aperture radar [InSAR], seismic, Global Positioning System [GPS], etc.) and is compiling comprehensive data sets for a few selected sites of high priority intended to be used in research to support increased understanding of the hazards. In 2013, CEOS officially endorsed Hawaii and Iceland to receive coordinated space-based EO data acquisitions. In 2014, CEOS will consider proposals for new Supersites to support specific seismic and volcano hazards, in conjunction with the DRM activities outlined above.

CEOS will work to facilitate coordinated data access to the data made available to the GSNL by suitable means. In particular, a web client will be configured to search and access the data catalogues held de-centrally.

**2015-2016:** In complement to – or as part of – the current CEOS DRM Pilots related to the GSNL initiative,CEOS Agencies will also regularly monitor the use of space data by scientific community involved in GNSL and will assess the potential extension of number of sites supported by CEOS Agencies. Event Supersites, which are agreed and supported for a limited time immediately following a major disaster, will be considered and supported as approved during this time frame.

| **Observations for Disasters Objectives/Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| DIS-1: Strategy for preparing the 2015 WCDRR and the *post-Hyogo Framework for Action (HFA2)* | Q2 2014 | Propose a way forward for the 2015 World Conference on Disaster Risk Reduction (WCDRR). | WGDisasters |
| DIS-2: Proposal for Recovery Observatory | Q2 2014 | Develop the full Recovery Observatory proposal for the approval. | WGDisasters with support from WGISS |
| DIS-3: Data Acquisition Plan in support to DRM Pilots | Q2 2014 | Prepare for approval the strategic data acquisition plan in response to the floods, seismic hazards, and volcanoes pilots’ EO requirements. | WGDisasters |
| DIS-4: Decadal Plan (2015-2025) to address top priority HFA2 needs | Q2 2016 | Develop a long-term plan (2015-2025) to address top priority HFA2 needs. The plan will be prepared in close cooperation with the major stakeholders involved in DRR including donor agencies, and with key representatives of the DRR user community. | WGDisasters |
| DIS-5: Revised Geohazard Supersite Selection Process and decision on new proposed Supersites | Q4 2014 | Review working procedures between Supersites Coordination Team and WGDisasters and develop an improved Geohazard Supersites selection process. Endorse Turkey (Marmara sea), Vesuvio and Etna volcanoes (Italy) as new permanent Supersites supported by CEOS in complement to Hawaii and Iceland. Additionally, Event Supersites may be proposed at any time during 2014. | Supersite Coordination Team |
| DIS-6: Web client to facilitate joint catalog search and access to Supersite data | Q4 2014 | The SCT agreed to implement standard web services to enable catalog search on Supersite data and access protocols for Supersite data holdings. | Supersite Coordination Team |

## Capacity Building, Data Access, Availability and Quality

* 1. **Advance CEOS Data Democracy activities.**

**2014:** In accordance with GEO’s three-year (2012-2015) Work Plan, the Working Group for Capacity Building and Data Democracy (WGCapD) will build upon the CEOS Data Democracy Initiative in an effort to increase the capacity of institutions in less developed countries so they may use EO data to achieve sustainable development. This effort will include: 1) Continuing the Digital Elevation Model (DEM) workshops and pursuit of Shuttle Radar Topography Mission (SRTM) 30m data with a proposed workshop in Nepal; 2) Providing practical EO education for students and teachers; 3) Organizing e-learning courses on Remote Sensing technologies for university educators in developing countries; 4) Populating the Capacity Building Portal, hosted by the Earth Observation for Economic Empowerment (EOPOWER) project, and increasing the awareness of the Capacity Building Inventory; 5) Planning the implementation of the TanDEM-X Edu Project, that aims at increasing awareness of TandEM-X data among university students in scientific projects for disaster management and hydrological modeling (the SAR data shall be available in 2015); and 6) Supporting the CEOS DRM Pilots as the liaison for capacity building activities.

**2015-2016:** Continue updating and improving the Capacity Building Portal.

* 1. **Continue to support the development and operationalization of the GEOSS Common Infrastructure (GCI) and its CEOS-related elements.**

**2014:** Through the Working Group on Information Systems and Services (WGISS), CEOS Agencies will foster the implementation and enhancement of the GEOSS Common Infrastructure (GCI) through continued development and coordination of tools that improve discovery, interoperability, and access to satellite data. Such tools include the CEOS WGISS Integrated Catalogue (CWIC), the International Directory Network (IDN), the Heterogeneous Missions Accessibility (HMA), and the Federated Earth Observation (FedEO) protocol-based system. WGISS will also transition to the Open Geospatial Consortium (OGC) OpenSearch standards and will develop a guidelines document, *CEOS OpenSearch Best Practices* to explain how to use the OpenSearch document as the common search and access mechanism in FedEO and CWIC.

WGISS will continue to promote and exchange technical information and lessons-learned experience about current and trending data system technologies/services impacting CEOS Agencies.

**2015-2016:** WGISS will support data access for the CEOS Virtual Constellations, Working Groups, and GCI through the use of the CEOS OpenSearch protocol, which will make CWIC and FedEO accessible from external clients such as the GCI. WGISS will also ensure that the IDN will be used as a dataset registration system for CEOS Agencies and will demonstrate/showcase the Virtual Constellation data access initiative.

* 1. **Coordinate the development of suitable methodology for the on-ground characterization of satellite-based EO sensors, the calibration of EO missions, and the validation of satellite-based Level 1 and Level 2 product.**

**2014-2016:** The Working Group on Calibration and Validation (WGCV) will continuously carry out contributions to the calibration of Satellite based sensors and the validation of Satellite based Earth Observation data products as it is its basic objective. The results are the building blocks for the other VCs and WGs in terms of calibration and validation. For these broad applications the emphasis of different tasks is focused in several sub-groups dealing with specific areas of interest. Three sub-groups serve in particular the calibration of sensors and their link to international acknowledged standards. Another three sub-groups are related to topical subjects in validation of data products.  
  
WGCV will continuously maintain the CEOS Cal/Val portal including subsequently the activities of its sub-groups. The Cal/Val portal will provide users information about achievements in calibration and validation and the Cal/Val supersites.

* 1. **Continue the cooperation with other CEOS elements in supporting by well-calibrated and validated data records.**

**2014-2016:** The Working Group on Calibration and Validation (WGCV) will intensify and structure its original goals along the needs of the new challenges arising within CEOS. With the implementation of WGClimate, the response to the GEO Carbon Strategy report by CEOS through the Carbon Task Force, and the further implementation of Virtual Constellations a high demand specifically oriented on the need of those groups can be identified. In order to serve their needs, the WGCV will implement based on their current structure a customer-oriented approach by offering CEOS internal the WGCV opportunities to those entities. In a first step WGCV will summarize its current capabilities in a gap analysis subsequently followed by the identification of opportunities in a second step for cooperation on working level with the other CEOS Working Groups and Virtual Constellations. Once those opportunities are systematically summarized, the cooperation level can be concretely intensified and specific measures along the needs and goals of the VCs and Working Groups identified.

* 1. **Continue cooperation with GEO, GSICS, and WMO and ground-based networks in the provision of high quality EO data products.**

**2014-2016**: WGCV will continue its work with the GEO Secretariat including the GEO Tasks, mainly by extension of its leadership in Quality Assurance for Earth Observations (QA4EO) to encourage widespread adoption of QA4EO Principles within future and, where possible, current CEOS activities. WGCV will extend the showcase repository to address science and data product provider community needs by ideally covering Level 1 Atmosphere, Terrestrial, and Ocean “compartments”. The development of calibration infrastructure and comparisons campaigns within the frame of WGCV will also be used to follow and promote QA4EO Principles and best practices.

WGCV will strengthen its cooperation with Global Space-based Inter-calibration System (GSICS) in the topic of sensor calibration. For that WGCV will summarize in a first step its current capabilities followed by the identification of opportunities for cooperation. Once those opportunities are identified those will be clearly settled together with GSICS in a working framework.

WGCV will also strengthen its cooperation with WMO and ground-based networks in terms of broadening the base for calibration and validation. For that the cooperation with representatives of networks will be deepened, especially with dedicated presence during WGCV meetings.

| **Capacity Building, Data Access, Availability and Quality Objectives/Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| CB-1: Digital Elevation Model (DEM) workshops | Q4 2015 | Pursuit of Shuttle Radar Topography Mission (SRTM) 30m data with a proposed workshop in Nepal. | WGCapD |
| CB-2: Provide practical EO education for students and teachers | Q4 2016 |  | WGCapD |
| CB-3: E-learning courses on remote sensing technologies | Q4 2016 | Organize e-learning courses for university educators in developing countries; follow-up to initial e-learning pilot for select African countries in 2013. | WGCapD |
| CB-4: Capacity Building Portal | Q2 2015 | Populate the Capacity Building Portal, hosted by the Earth Observation for Economic Empowerment (EOPOWER) project; portal aims at increasing the awareness of the Capacity Building Inventory across CEOS and GEO. See GEONetCab site at http://www.geonetcab.eu/). | WGCapD |
| CB-5: Implement the TanDEM-X Edu Project | Q3 2016 | Plan for the implmenetation of the TanDEM-X EduProject which aims at increasing awareness of TanDEM-X data among university students in scientific projects for disaster management and hydrological modeling (dependent on SAR data being made available in 2015) | WGCapD |
| CB-6: Capacity Building for DRM | Q4 2016 |  | WGCapD with support from WGDisasters |
| DATA-1: *CEOS OpenSearch Best Practices* Guideline Document | Q4 2014 | This document will serve as a guideline that shows common set of rules that help CEOS agencies implement OpenSearch service aligning with the CEOS best practice, eventually to achieve better interoperability among CEOS agencies. Also, this document will be of benefit to CEOS portals or any client developer who is interested in CEOS satellite data and wants to make use of the satellite data catalogs in their application. | WGISS |
| DATA-2: Full representation of CEOS Agency datasets in the IDN and accessible via CWIC/OpenSearch | Q4 2014 | As the IDN contains opensearch endpoints for data access and is also the link with GEOSS GCI, it is essential that all agencies keep information on the data up to date in the IDN. Also will encourage timely access to products developed by the Virtual Constellations (i.e., GHRSST). | WGISS with support from VCs |
| CV-1: QA4EO | Ongoing | The WGCV is encouraging agencies to use QA4EO framework to help harmonize and promote QA best practice and benefits of rigorous Cal/Val and will develop improved guidance on its application and case studies on its application and benefit. | WGCV |
| CV-2: Cal/Val portal WGCV update | Q4 2015 | Subsequent inclusion or linkage of sub-group web-sites with CEOS Cal/Val portal including an update of sub-group web-sites | WGCV |
| CV-3: Cal/Val portal maintenance | Ongoing | Inclusion of recent achievements in Cal/Val and with respect to Cal/Val sites | WGCV |
| CV-4: Website for SAR calibration sites and targets | Q3 2015 | Establish and maintain a website for SAR calibration sites including both natural and man-made targets. Characterize natural targets in different frequency bands. | WGCV |
| CV-5: Workshop on state-of-the-art for pre-flight calibration techniques | Q1 2016 | Hold an open invitation workshop to discuss and promote best-practices on pre-flight and on-board calibration of sensors initially focusing on optical | WGCV |
| CV-6: WGCV self-analysis for capabilities to serve VC and WGs need | Q1 2015 | WGCV will summarize its capabilities on hand the new demands of the VCs and WGs. | WGCV |
| CV-7: WGCV support to WG and VC on their specific needs | Q2 2015 to Q4 2016 | WGCV will tailor specific opportunities on working level for each WG and VC subsequently in cooperation with those groups | WGCV |
| CV-8: Set-up GSICS cooperation | Q4 2014 | Analyze of opportunities for cooperation with GSICS and set-up of concrete topical fields for cooperation | WGCV |
| CV-9: GSICS cooperation arrangement | Q2 2015 | Cooperation arrangement with GSICS | WGCV |
| CV-10: GSICS cooperation | Q3 2015 to Q4 2016 | Cooperation with GSICS in specific domains of sensor calibration, especially sensor inter-calibration. | WGCV |
| CV-11: Inter-calibration of ground-based networks in supporting validation of AQ products | Q4 2016 | Inter-calibration of air quality ground-based networks in cooperation with WMO/GAW and NDACC supporting the validation of atmospheric sensor data products | WGCV |
| CV-12: Characterization of ground-based networks in supporting validation of AQ products | Q4 2016 | Planning and characterization of air quality ground-based network in cooperation with NDACC, AERONET/PHOTION and with the VC-ACC | WGCV |
| CV-13: SST & LST Comparison Campaign Plan | Q2 2014 | Set up a multi-agency comparison project to ensure international consistency in post-launch Cal/Val of satellite derived Earth surface temperatures for climate data records. | WGCV with support from SST-VC |
| CV-14: SST/LST laboratory Comparison Campaign Implementation | Q4 2014 | Implementation of the SST comparison campaign. | WGCV with support from SST-VC |
| CV-15: SST Operational Validation White Paper | Q1 2014 | The White Paper is being developed now which includes the plan for the project and costing. | WGCV |
| CV-16: Water based SST comparison campaign implementation | Q1 2015 | Initiated ocean based SST comparison campaign to ensure international harmonization and validation of SST products | WGCV supported by VC-SST |
| CV-18: LST field comparison implementation | Q2 2015 | Initiate LST field comparison to ensure harmonization of LST measurements in a range of conditions | WGCV |
| CV-19: RADCALNET | Q1 2014 to Q4 2016 | Establish via a multi-agency project an automated network, including coordination infrastructure, of land based test-sites for post-launch traceable calibration of sensor radiometric gain initially for <50 m resolution sensors | WGCV |
| CV-20: Analysis of intermediate DEM from TanDEM-X | Q4 2014 | Analysis of intermediate TanDEM-X with respect to accuracy, completeness, and quality for CEOS test sites in Europe; demonstrating its potential in the UK for the improvement of very high resolution landslip mapping | WGCV |
| CV-21 Analysis of final DEM from TanDEM-X | Q1 2015 to Q4 2016 | Follow-up study for final TanDEM-X DEM product over nine globally spread CEOS test sites and test areas over UK. | WGCV |
| CV-22: Application checks for TanDEM-X DEMs | Q1 2015 to Q4 2016 | Fitness for purpose of TanDEM-X products (see CV- and CV above) assessment for geo-radiometric correction of high resolution optical imagery (Sentinel-2) and of SAR data from Sentinel-1. | WGCV |
| CV-23: Update of validation stage for ECVs | Q4 2014 | Update of validation stage of ECVs covered within WGCV-LPV and publication on WGCV-LPV website | WGCV |
| CV-24: Synthesis of state of the art of validation methods for ECVs | Q1 2015 | ECV-specific synthesis of state of art validation approach for each terrestrial variable covered within WGCV-LPV. Corresponding references and protocols are listed on WGCV-LPV website. | WGCV |
| CV-25: Validation data set identification | Q4 2015 | ECV-specific identification of a golden standard for validation of ECVs covered within WGCV-LPV. | WGCV |
| CV-26: ECV-specific validation protocols | Q4 2016 | Continuation of development of ECV-specific validation protocols (moving from good practices towards best practice), including community review process and updates | WGCV |
| CV-27: Evaluation of validation supersites and new validation approaches | Q2 2015 | Evaluation of well-characterized supersites with data continuity prospect for validation purposes that allow for testing of products, algorithms and validation strategies through radiative transfer modelling. | WGCV |

## Advancement of the CEOS Virtual Constellations

* 1. **Characterize the Virtual Constellations in the context of both the development of the space segment for GEOSS and of the multitude of outcomes and deliverables that CEOS seeks to provide for GEO and other users and frameworks.**

**2014-2016:** Ensure that the Virtual Constellations (VCs) – Atmospheric Composition (AC-VC), Land Surface Imaging (LSI-VC), Ocean Colour Radiometry (OCR-VC), Ocean Surface Topography (OST-VC), Ocean Surface Vector Wind (OSVW-PC), Precipitation (P-VC), Sea Surface Temperature (SST-VC) – are accomplishing the outcomes and deliverables associated with the activities documented in the CEOS Virtual Constellations Process Paper and the respective Virtual Constellation’s Terms of Reference.

| **Advancement of the CEOS Virtual Constellations: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| VC-1: List of Relevant Datasets from VCs |  | Results of study will be fed into WGISS IDN to ensure coverage of all VC data. | VCs with support from WGISS |
| VC-2: Total ozone dataset validation and harmonization | Q4 2014 | Total ozone measurements from multiple sensors are being considered by AC-VC. The separate long term American and European total ozone data sets (with clear error characterization) are already proving valuable to the user community. An effort to combine European/American datasets is in progress with the goal to produce a long-term ozone data set for the atmospheric modeling community. There is a need to develop common validation protocols and extend the process to other ozone datasets (e.g., Chinese FY3 observations). | AC-VC |
| VC-3: Share pre-launch calibration plans, instrument characterization/  calibration databases, and Level 1-b data in a common format to allow application of common algorithms to all datasets | Q2 2015 | Three geostationary instruments to monitor air quality are scheduled to fly late in this decade: Sentinel 4, TEMPO, and GEMS. Community efforts are exploiting synergies among the instruments to enhance their value for science and decision support by developing common calibration and validation techniques and developing standard constellation products based on the community-developed white paper <http://ceos.org/images/ACC/AC_Geo_Position_Paper_v4.pdf>, which was endorsed at SIT-26. | AC-VC |
| VC-4: Operational demonstration service for volcanic ash (and SO2) monitoring and forecasting | Q3 2014 | Use data from multiple instruments capable of observing volcanic emission gases and aerosols, including OMI, GOME-2, AIRS, and IASI to provide operational demonstration services to users in the aviation and other relevant user communities. | AC-VC |
| VC-5: Coordination of algorithm development and calibration/validation support for the GHG constellation | Q2 2015 | Multiple instruments to measure atmospheric greenhouse gases are planned or under development in addition to GOSAT in the coming years. To enhance the value of these measurements, the AC-VC is coordinating algorithm development, calibration/validation support, and other activities consistent with the actions recommended in the CEOS Carbon Task Force report, “CEOS Strategy For Carbon Observations from Space.” | AC-VC |
| VC-6: Vision and plan for an Essential OCR-Virtual Constellation space segment (Polar and GEO) | Q4 2016 | Objective is a plan to meet goals identified in the OCR-VC terms of reference. Data continuity needs to be assured, including data quality assessments and comparisons of existing and upcoming (as well as previous) sensors and mitigation of launch delays, maintenance of critical cal/val and QA activities, general implementation of minimum ocean color mission requirements, and new and improved products. Key gaps will still exist, e.g., next generation R&D missions to expand observing capabilities and scientific knowledge, likewise additional geostationary ocean color platforms. | OCR-VC |
| VC-7: Catalogue of Cal/Val infrastructure and activities |  | This will help in identifying risks, the needs for advancement and to promote agency calibration. | OCR-VC |
| VC-8: Action Plan for GEO Blue Planet Components | Q1 2015 | Components as identified in the revised Blue Planet Task White Paper (November 2013). | OCR-VC |
| VC-9: Updated OST CEOS Constellation URD |  | Update will encompass SAR Mode Altimetry. | OST-VC |
| VC-10: Catalog of Cal/Val infrastructure |  | This catalog will help with Cal/Val planning and promote agency coordination. A major interest of the OST-VC is the sustainability of critical Cal/Val elements. | OST-VC |
| VC-11: Reprocessing strategy for TOPEX/Jason-1 (ENVISAT?) missions |  |  | OST-VC |
| VC-12: Vision for an OSVW Constellation |  | White Paper describing and justifying the oceanography and climate requirements for an OSVW constellation. | OSVW-VC |
| VC-13: OSVW Standards and Metrics |  | Standards and metrics for OSVW services and products, including standard Cal/Val methods. | OSVW-VC |
| VC-14: P-VC Data Portal and links to CEOS Water Portal | Q1 2015 | Completion of Phase 2 of the P-VC Data Portal providing free and open availability of precipitation products in support of CEOS-GEO Actions WA-01-C1\_3 and WA-01-C1\_4. | P-VC |
| VC-15: Support to ECV precipitation parameters | Q4 2016 | Precipitation ECV support: Provide the CEOSResponse to GCOS Action A-8 - Ensure continuity of satellite precipitation products through five deliverables. | P-VC |
| VC-16: Programs for improvement of global precipitation products | Q4 2016 | Precipitation products (with respect to algorithm development, outputs and user requirements) using multi-satellite and multi-agency data through coordination between PC partners. | P-VC |
| VC-17: Documented plan for the SST Virtual Constellation | Q3 2015 | Building on Donlon et al (2010) *Successes and Challenges for the Modern Sea Surface Temperature Observing System,* the SST-VC will describe and justify the requirements and design fo the modern virtual constellation for SST. This description of an optimal SST constellation will prove useful to CEOS Agencies in planning and implementing a globally coordinated and cost-effective observing capability for SST. | SST-VC |

## Support to Other Key Stakeholder Initiatives

* 1. **Continue CEOS contributions and maintain leadership role in the GEO Blue Planet Task.**

**2014:** As multi-sensor oceanographic satellite observations continue to be successfully transitioned from research into routine and sustained operations, supporting a diverse suite of research and applications, there are significant opportunities to support the components and associated priority actions identified in the GEO Blue Planet Task with these space-based observations. The Ocean Colour Radiometry, Ocean Surface Topography, Ocean Surface Vector Wind, and Sea Surface Temperature Virtual Constellations (VCs) will work to develop coordinated, multi-sensor ocean products including sea surface height, sea surface temperature, sea surface salinity, sea surface winds, and chlorophyll-a (and other ocean color-derived) data into collocated and readily accessible dataset packages with fit for purpose latency (near-real time as well as delayed mode). The planning project is called CEOS Ocean Variables Enabling Research and Applications for GEO (COVERAGE). Individual VCs will likewise continue to identify their own specific contributions to the various Blue Planet Components.

**2015-2016:** CEOS may develop experimental and operational data, products and services to explore optimal utility of COVERAGE for applied, industrial, and research uses.

* 1. **Further develop CEOS contributions to meet biodiversity observation requirements.**

**2014:** The CEOS Biodiversity Expert will work with CEOS Agencies in close consultation with the GEO Biodiversity Observation Network (GEO BON) to better define biodiversity and conservation user requirements and assess related CEOS Agencies’ observation capabilities in support of the 2020 targets for the Convention on Biodiversity (CBD). Using an approach similar to that which was implemented for ECVs, CEOS will consult with GEO BON and CBD representatives to better define CBD-related Essential Biodiversity Variables (EBVs) that may be supported by space-based EO. CEOS representatives will participate in ongoing data provider/user community consultations on this topic, to assess the potential level of CEOS support, and make appropriate recommendations to CEOS leadership.

**2015-2016:** The CEOS Biodiversity activity will engage in various workshops and symposia to increase the visibility of remote sensing for biodiversity related application. Moreover the different user groups (practitioner, decision makers) will be targeted concerning their different needs for remote sensing application. Lists of remote sensing product priority for different EBVs and user groups will be assembled. Joint funding proposal for innovative application of remote sensing for biodiversity research will be pursued in order to be able to provide a range of relevant products and services.

* 1. **Continue dialogue on potential CEOS contributions to Integrated Water Cycle products and services.**

**2014:** In 2014, the GEOSS Water Strategy Report was released, which included ten actions that space agencies should accomplish to implement the strategy. The CEOS Water Expert will work with CEOS Agencies to develop and coordinate Agencies’ input on implementing the GEO Water Strategy. CEOS will engage with GEO to identify specific ways in which CEOS can support improved water cycle products and services. CEOS will also support data portals (including the CEOS Water Portal) and satellite data provision, validation, and capacity development for regional initiatives in Asia, Africa, and Latin America.

**2015-2016:** CEOS will continue the effort with GEO to identify specific ways in which CEOS can support to advance satellite data acquisition.

* 1. **Continue dialogue on enhanced CEOS-level coordination to support improved research and monitoring of the Earth’s Polar Regions.**

**2014:** CEOS Agencies will maintain a dialogue with GEO, CGMS, and the World Meteorological Organization (WMO) on their respective interests and coordination initiatives relating to polar observations. CEOS Agencies will consider the best means to interact with the WMO Polar Space Task Group (PSTG) to facilitate acquisition and distribution of fundamental satellite datasets for the development of specific information products for polar research and applications (e.g., cryospheric, atmospheric, etc.). CEOS will identify a more formal mechanism to interact with the PSTG. CEOS will support continued data acquisition ensure the full coverage and monitoring of the ice sheets. Fast flowing glaciers, often considered as evident indicator of climate change impacts, will also be monitored at high resolution.

**2015-2016:** CEOS Agencies will continue to maintain a dialogue with GEO, CGMS, and the World Meteorological Organization (WMO) on their respective interests and coordination initiatives relating to polar observations. CEOS and PSTG will continue to facilitate acquisition and distribution of fundamental satellite datasets for the development of specific information products for polar research and applications (e.g., cryospheric, atmospheric, etc.). CEOS Agencies will support the development of key science products under their own respective science programs. The PSTG, charged with prioritizing requirements, engaging in a dialogue with polar science authorities, and supporting the development of satellite sensor derived products for cryospheric research and applications, will encourage formal submission of science requirements documents from the cryosphere communities (permafrost, sea ice, snow cover, etc.). CEOS and PSTG will develop observation strategies to avoid observational gaps over polar regions.

| **Support to Other Key Stakeholder Objectives/Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| BP-1: Compilation of ocean variables into coordinated dataset packages – the CEOS Ocean Variables Enabling Research and Applications for GEO (COVERAGE) |  | Coordination of oceanic ECVs into single package deliveries, with fit for purpose latency for research and applications. The four ocean VCs (in coordination with the Blue Planet committee) need to determine what CEOS can deliver to this project. What does CEOS need to do differently in the future to support this project? How can CEOS support "integration" of activities across Virtual Constellations and individual missions? What are the achievable spatial-temporal scales and appropriate latencies for multi-variable packages? | CEOS Blue Planet Expert (NASA) |
| BON-1: Further define biodiversity variables that may be supported by space-based observations | Q4 2014 | Consult with biodiversity community representatives (GEO BON, CBD, CRSnet etc.) to better define relevant space-borne parameters (e.g. for EBVs). | CEOS Biodiversity Experts (DLR and NASA) |
| BON-2: Continue to define biodiversity variables that may be supported by space-based observations and engage international community in coordinating biodiversity/conservation initiatives | Q4 2015 | Review and improve list of relevant space-borne variables, to include marine systems as well on top of terrestrial applications. Hold joint sessions with biodiversity/conservation community at international conferences (e.g. ISRSE). Coordinate different biodiversity/conservation initiatives related to EO (CCI, CRSnet, GEO BON). List of future needed parameters. | CEOS Biodiversity Experts (DLR and NASA) |
| BON-3: Increase the visibility of remote sensing for biodiversity related application | Q4 2016 | Joint symposium with all initiatives, exploring links to other CEOS activities. Develop joint forum/data archive and define processing chains. | CEOS Biodiversity Experts (DLR and NASA) |
| WAT-1: Response to GEOSS Water Strategy | Q4 2016 | Evaluate how CEOS Agencies will respond to the ten actions identified for space agencies. | CEOS Water Expert (JAXA) |
| POL-1: Annual Status Report | Q4 2014 | Facilitate communication between PSTG and CEOS through provision of an annual status report on polar activities and develop a formal collaboration approach with PSTG. | CEOS Polar Expert (CSA) |

## Outreach to Key Stakeholders

* 1. **Engage, attend, be strategically involved (where appropriate), report on CEOS achievements, and present at key meetings.**

**2014-2016:** CEOS desires to increase and improve the connections between CEOS and its stakeholders during deliverable development. CEOS leadership and the national delegations of CEOS Agencies will expand links with stakeholders to inform ministers of CEOS Earth observation products and coordination efforts and to enlist appropriate G20/G8 support for enhanced Earth observation coordination. CEOS should highlight CEOS achievements in global change monitoring and the significance of long-term satellite observation capabilities in statements to key high-level meetings. Key 2014 meetings identified for CEOS liaison include the GEO-XI Plenary and the UN Framework Convention on Climate Change 20th Council of the Parties (COP-20, November 2014). Key 2015 meetings will be identified as announced.

* 1. **Maintain and annually update CEOS online services such as the CEOS website and Missions, Instruments and Measurements (MIM) database.**

**2014-2016:** The CEOS Database (a.k.a., the Missions, Instruments and Measurements MIM) is the only official consolidated statement of CEOS Agency programs and plans. Each year, the database will be updated based on survey inputs provided by all CEOS Agencies to reflect the current status of CEOS Agency missions and instruments. ESA and the SEO have developed a number of analysis and visualization tools to apply this information in support of gap assessments. Together, these resources represent the cornerstone of CEOS capability to undertake informed coordination decisions. CEOS will continue development of these resources each year, with a particular focus on engaging them for ECV development and observational gap analyses as well as adding new enhancements for advanced search capabilities, addition of links to other CEOS resources (i.e.,CEOS Visualization Environment [COVE], CWIC, IDN) or to external information systems, such as WMO’s Observing Systems Capability Analysis and Review Tool (OSCAR).

In 2014, the ESA CEOS Database team will work on the initial integration of the Database with the ECV inventory – creating a new tool for the community to browse and discover ECV data sets. This will be conducted in coordination with the SEO, WGClimate, and other interested members of the CEOS community.

To improve outreach impact, CEOS will revise its website to include a more modern user interface and updated appearance. The new website will maintain a “content management” approach and include new features for document management and meeting registration.

* 1. **Publish the CEOS Newsletter.**

**2014-2016:** CEOS, through contributions of JAXA, will continue the publication of this valuable, long-standing communication tool. It will be issued twice per year.

| **Outreach to Key Stakeholders: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| **OUT-1**: CEOS awareness and promotional material delivered at key meetings | N/A | The CEOS calendar will be used to confirm CEOS representation at key international and stakeholder meetings as updated throughout the three-year term. | CEOS Chair with support from CEO, SIT Chair and  CEOS SEC |
| **OUT-2**: CEOS Newsletter | Q1 and Q3 of each year | Call for information input in December and June  Newsletters released in February and August. | JAXA, with support from CEOS Agencies |
| **OUT-3**: CEOS Database update survey and release of online version | Survey Q2 annually, release Q4 annually | Background information: CEOS agencies to provide resources to support their response to the update survey issued in the April-May timeframe; release of the updated CEOS Database online prior to CEOS Plenary. | ESA, with support from SEO and CEOS Agencies |
| **OUT-4**: EO handbook | Q4 2015 | Periodic releases of EO Handbook rely on data from MIM. | ESA |
| **OUT-5**: Initial CEOS Database-ECV Inventory integration | Q4 2014 | Release of the initial integration of the ECV Inventory with the CEOS Database. | ESA, with support from SEO, WGClimate, and other CEOS Agencies |
| **OUT-6**: Updated CEOS website | Q4 2014 | SEO will present a proposal for update at SIT-29, and complete the update by 2014 CEOS Plenary. | SEO |

## Organizational Issues

* 1. **Develop additional detailed guidance documents as proposed by the CEOS Self-Study Implementation Initiative (CSSII).**

**2014:** Three documents will be prepared in 2014 to provide detailed information that supplements the general process descriptions described in the *CEOS Governance and Processes* document: a *CEOS Three-Year Work Plan*; a *Working Group Process Paper* detailing how Working Groups are proposed, formed, governed, and operated; and a *New Initiatives Process Paper* to describe details regarding the process by which new initiatives are proposed to and considered by CEOS. CEOS will also propose and implement a new document configuration management system.

| **Organizational Issues Deliverables: 2014-2016** | | | |
| --- | --- | --- | --- |
| **Objective/Deliverable** | **Projected Completion Date** | **Background Information** | **Responsible CEOS Entity** |
| **ORG-1**: First Version of the new CEOS Three-Year Work Plan (this document). | Q1 2014 | This version should be suitable for: a) providing visibility to SIT and Plenary regarding the main CEOS deliverables and associated activities, and b) monitoring progress during the course of the year (e.g., by providing progress reference points for the regular SIT and CEOS Chair tag-ups with Working Groups and VCs). | CEO |
| **ORG-2**: Process Paper for CEOS Working Groups | Q2 2014 | Prepare a Process Paper for guidance on the leadership, structure, governance, execution of activities, evolution of Working Groups; provide guidelines for proposing new Working Groups. | CEO in consultation with SEO and CEOS SEC |
| **ORG-3**: Process Paper for CEOS New Initiatives | Q2 2014 | Prepare a Process Paper for guidance on proposals for new CEOS initiatives to include specific criteria and steps required to successfully address new internal and external requests for activities/initiatives. | CEO in consultation with SEO and CEOS SEC |
| **ORG-4**: Document Management System | Q4 2014 | A proposal for a CEOS Document Management System will be presented at SIT-29, and complete the update by 2014 CEOS Plenary. This system will be part of the website revisions. | SEO, CEO, and CEOS Chair |
| **ORG-6:**  Terms of Reference for WGDisasters | Q4 2014 | Confirm the structure of the CEOS WGDisasters and develop Terms of Reference encompassing the current work on Supersites coordination, Disaster Risk Management (three pilots and acquisition strategy), the Recovery Observatory proposal, the Disasters Societal Benefit Area and other CEOS disaster-related activities. | WGDisasters |

*This CEOS Work Plan will be updated annually by the CEO under the guidance of the CEOS Chair, and in consultation with the CEOS Strategic Implementation Team Chair, CEOS Secretariat, CEOS Working Groups, Virtual Constellations, Ad Hoc Teams, the CEOS membership at large, and CEOS’s external stakeholders. This document shall be consistent with and mutually supporting of other CEOS guiding documents.*

1. These treaties, international organizations, and international programs include the UN Framework Convention on Climate Change (UNFCCC), the UN Commission on Sustainable Development (UNCSD), the UN Office for Disaster Risk Reduction (UNISDR), and the Convention on Biodiversity (CBD), among others. [↑](#footnote-ref-1)