

CEOS Ad Hoc Working Group for GEOGLAM: Scope of Work

1. Goals of the CEOS Ad Hoc Working Group for GEOGLAM

The Committee on Earth Observation Satellites (CEOS) Ad Hoc Working Group for the Group on Earth Observation Global Agricultural Monitoring (GEOGLAM) Initiative was established in 2012 by CEOS to respond to the space-based Earth observation (EO) data needs set forth by GEOGLAM. Since 2013, the Ad Hoc Working Group has been preparing an annually updated CEOS Strategic Response to GEOGLAM Requirements document, for CEOS Plenary's endorsement. However, that document is focused on EO data acquisition and does not cover the broader activities of the Ad Hoc Working Group, which include fostering strategic relationships and promoting and facilitating data access, data availability, and data utilization. This brief document will describe the broad scope of the Ad Hoc Working Group, demonstrating that this "co-community" of Space Agencies, scientists, and engineers is uniquely situated to resolve issues related to space data utilization that are experienced by GEOGLAM as well as across disciplines and geographic locations.

2. Relationships

GEOGLAM, established in 2011 by the G20 Agricultural Ministers as a part of their action plan on food price volatility, has as its over-arching goal to improve the international capacity to generate and disseminate timely, accurate, transparent, and relevant information on crop condition and early forecasts of crop production. CEOS, as the space arm of GEO, in general and through this Ad Hoc Working Group, is committed to assisting GEOGLAM in acquiring and gaining access to R&D-oriented and sustained space-based EO data required to meet its diverse projects' and activities' goals. One of GEOGLAM's cross-cutting components is "EO Data Acquisition & Dissemination Coordination" (Component 4), and this Ad Hoc Working Group assists in the execution of this component, facilitating a broad range of research and development activities that will be transitioned to agricultural monitoring institutions who will support sustained space-data needs. The Ad Hoc Working Group also communicates with the GEOGLAM Secretariat to stay abreast of the rapidly evolving GEOGLAM data requirements and activities (e.g. Asia-RiCE (Rice Crop Estimation and Monitoring), Joint Experiment on Crop Assessment and Monitoring (JECAM), Stimulating Innovation for the Global Monitoring of Agriculture (SIGMA), and Sentinel-2 for Agriculture).

3. Activities

As GEOGLAM has evolved and the Ad Hoc Working Group has matured, it has become clear that the coordination of space-based EO data goes far beyond acquisition alone, as there are considerable barriers to accessing and utilizing the data. These issues include legal barriers (i.e., restricted datasets), financial barriers (i.e., fee-based datasets), connectivity and computational barriers, and utilization barriers (i.e. data quality due to calibration/validation or geolocation errors, or lack of interoperability). As such, the Ad Hoc Working Group's activities have expanded to address, as much as possible, these pressing challenges.

The Ad Hoc Working Group has both short- and long- term goals, the attainment of which involves flexibility of implementation. For example, it was not until the second year of the Ad Hoc Working Group's existence that the broader issues of data access and availability were acknowledged as a priority. It is crucial that the Ad Hoc Working Group remain flexible enough to adapt through lessons-learned and to expand their mandate and activities to meet these critical challenges.

While in the short term the Ad Hoc Working Group's efforts are focused on coordinating data for GEOGLAM, in the longer term, CEOS and this particular Ad Hoc Working Group can promote free and open data policies by demonstrating that the true benefit of EO based data cannot be assessed merely in scenes sold or disseminated, but more significantly through disasters mitigated and food crises anticipated due to early and synoptic analyses made uniquely possible through EO.

3.1 Activities 2012-Present

The activities of the Ad Hoc Working Group have included, to date:

1. Supporting GEOGLAM in the organization of EO data requirements, and identifying and evaluating candidate missions to address these requirements. The requirements are drawn from best-practices for agricultural monitoring and information provision from GEOGLAM. Detailed assessments included coverage analyses and gap analyses, accounting for cloud cover impacts on optical acquisitions;
2. Developing an annually updated CEOS Strategic Response to GEOGLAM Requirements document, with a long-term vision toward ramping up to sustained imaging for national to regional to global scale operational monitoring programs;
3. Supporting data acquisitions for research and development toward operations, largely coordinated through JECAM in cooperation with SIGMA, Asia-RiCE, and Sentinel-2 for Agriculture;
4. Linking to CEOS mission acquisition metadata, so as to facilitate the analysis of data records for backward-looking analyses, including analyses promoting the interoperable use of multiple sensors (SAR, optical, microwave, and the integration of multiple data types);
5. Assisting in the development of flexible user agreements, to facilitate access to restricted datasets. This was initially focused on access to Radarsat-2 data, through the use of a Multiple User Request Form (MURF), but it is expected such agreements could be adapted for other restricted datasets;
6. Engaging non-traditional and commercial EO suppliers, which have valuable satellite assets for GEO activities. As an example, RapidEye data is currently utilized by several JECAM sites;
7. Developing agricultural overlays and tools for the CEOS Systems Engineering Office's COVE (CEOS Visualization Environment) tool. This includes land cover classification models, revisit analyses, and a coverage analyzer tool to support long-term country-level coverage assessments;
8. Developing and prototyping data management services, to confront and mitigate challenges related to data storage, internet connectivity, and computational power for data analysis and visualization. These prototype Space Data Management Systems (SDMS), developed by the CEOS Systems Engineering Office, have been utilized and tested by FAO and the Asia-RiCE projects.

3.2 Activities 2015 & Beyond

Planned future activities of the Ad Hoc Working Group will include:

1. Evaluation of the acquisition metadata archives using the COVE tool, and requesting archival data for GEOGLAM usage in the production of baseline datasets (e.g. crop area & type masks, and crop calendars) and in promoting interoperability amongst datasets;
2. Annual updates of the CEOS Strategic Response to GEOGLAM Requirements (see accompanying document);
3. Further development of the Space Data Management System (SDMS) prototypes to support JECAM, Asia-RiCE and other GEOGLAM initiatives, including resolving issues of distributing restricted-use datasets;
4. Development and prototyping of the "Data Cube" concept to support agriculture applications, with candidate pilots including Kenya and Colombia;
5. Evaluation of emerging global agriculture initiatives that will require EO data (e.g. Rangelands and Pasture Productivity (RAPP), Early Warning Crop Monitor);
6. Evaluation of new datasets, including the European Sentinel missions, other CEOS missions, small satellites, and commercial space assets.

