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CEOS WORKING GROUP ON CAPACITY BUILDING AND DATA DEMOCRACY: OPPORTUNITIES FOR COOPERATION

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ABSTRACT

This paper will examine the opportunities for intergovernmental and non-governmental organization (NGO) cooperation within the Committee on Earth Observation Satellites (CEOS) Working Group on Capacity Building and Data Democracy (WGCapD). It will outline the objectives of the working group, discuss the advantage of cooperative methods for achieving those objectives, provide potential implementation activities, and suggest ways the WGCapD experience can inform cooperation on other Earth Observation activities.

The CEOS WGCapD exists to improve the ability of end users, particularly in less developed regions of the world, to access satellite-based Earth Observation (EO) data and utilize it for achieving sustainable development. The WGCapD was born out of the CEOS Data Democracy Initiative, which began in 2008 under the CEOS Chairmanship of the South African Council for Scientific and Industrial Research (CSIR) and continued under the subsequent chairmanships of Thailand's GEO-Informatics and Space Technology Development Agency (GISTDA) in 2009 and Brazil's National Institute for Space Research (INPE) in 2010.

In the spirit of CEOS, the WGCapD operates under the belief that international coordination and cooperation is the best way to realize its goal of the effective use of satellite-based EO data for achieving sustainable development. Impeding the realization of this goal, there is currently a lack of awareness of and access to EO data in developing regions of the world. The WGCapD aims to target these underserved communities and build their capacity to access and utilize EO data to reach their development goals. International coordination, as well as cooperation with NGOs, will maximize WGCapD's ability to achieve that goal. Some potential implementation activities were determined at WGCapD's strategy planning meeting held in early 2012.

Introduction

The effective use of Earth Observation data by users in all nations is essential for the understanding and stewardship of our planet. Furthermore, the advancement and sustainability of satellite-based Earth Observations will be determined by end users, who must be empowered through free access to these resources. Effectively reaching those end users, especially in developing countries, has been an impediment to the maximum use of Earth Observation data.

In an effort to sustain and maximize effective utilization of satellite-based EO assets, CEOS aims to coordinate global EO efforts. Achieving this end, particularly in the area of sustainable development, requires concerted cooperation and collaboration amongst CEOS members and, at times, with outside organizations. The CEOS Working Group on Capacity Building and Data Democracy (WGCapD) has become a forum for precisely that purpose. This paper will examine intergovernmental and NGO cooperation within the CEOS WGCapD and will suggest ways that the WGCapD's efforts might inform other attempts to broaden accessibility to and capacity to benefit from EO data in under-served communities.

Section 1: CEOS and WGCapD

CEOS, established in 1984 out of a need to organize global EO coordination efforts, provides a framework for international coordination of space-borne EO missions. CEOS has 30 Member space agencies and 22 Associate organizations. Although there are many areas in which satellite-based EO can benefit humanity, CEOS has agreed to focus on the following priorities: agriculture, food security, climate, deforestation, forest carbon, disasters, water and oceans. As well as organizing missions and activities in these priority areas, CEOS also makes great efforts to advocate Data Democracy, ensuring the timely access to key datasets and associated tools for the worldwide development of capacity in the use of EO from space.

Within CEOS, there are three main bodies: the Strategic Implementation Team (SIT), the Virtual Constellations (VC), and the Working Groups (WG). The SIT is tasked with ensuring that CEOS is coordinating and linking to the Group on Earth Observations (GEO). The seven VCs analyze global observing systems by subject area, identifying gaps, overlaps, and opportunities to fully exploit the current and future assets of the CEOS members. Finally, the four WGs aim to enhance coordination in topical areas that serve to benefit the entire globe. One of these WGs is the WGCapD.

The WGCapD, formerly known as the Working Group on Education, Training, and Capacity Building, was reconstituted in 2011 around the concept of Data Democracy. The idea of Data Democracy was introduced in 2008 during the CEOS Chairmanship of the South African Council for Scientific and Industrial Research (CSIR) and further advanced under the subsequent chairmanships of Thailand's GEO-Informatics and Space Technology Development Agency (GISTDA) in 2009 and Brazil's National Institute for Space

Research (INPE) in 2010. The objective of the Data Democracy Initiative, as noted in the 2010 CEOS Rio Plenary Statement, is the "provision of timely access to key data sets free of charge to build capacity worldwide,…enhanced data dissemination capabilities, sharing of software tools, increased training, and technology transfer to end users."

While the majority of WGCapD members are CEOS member countries, the WGhas also partnered with many other institutions, such as Secure World Foundation (SWF), the United Nations Office of Outer Space Affairs (UNOOSA), the Regional Center for Mapping of Resources for Development (RCMRD), the Centro Regional de Enseñanza de Ciencia y Tecnología del Espacio para América Latina y el Caribe (CRECTEALC), the World Bank, GEO, and the World Meteorological Organization (WMO) in an effort to amplify the capacity building efforts of all parties involved.

The WGCapD is focused on building capacity for the effective use of EO data as well as providing wider and easier access to those data. The WGCapD is achieving this through two mechanisms: establishing effective coordination and partnership among agencies and institutions offering education and training in EO, and working to address data accessibility, especially in under-served communities. Delivering the correct EO data in a format that the end user can understand and utilize, preferably free of charge, is the end goal of the WGCapD, and with help from its partner institutions, significant progress can be made towards reaching this goal.

Section 2: Advantages of Cooperation

Without information from EO satellites, decision makers would lack the information they need to make decisions on environmental policies or on which to base or enforce future agreements. Informed decisions require global data where many different parameters must be measured. No single nation or group of nations can hope to fulfill the data requirements of an ever increasing demand for information. In order to provide decision makers with the information they need, when they need it, EO missions must be coordinated globally.

Global coordination of EO satellites is the role that CEOS has been filling since its creation in 1984. CEOS is a best efforts, non-binding organization that makes decisions through consensus and finances its activities through individual commitments by its Members and partners. Without an overarching entity to enforce a global EO system and with space agencies beholden to domestic priorities and circumstances, it is imperative that cooperation occur within CEOS to meet the increased burden on global space agencies to supply data for many different initiatives. CEOS is achieving this cooperation by focusing on areas like continuity of measurements, polices, mission planning, formats, and capacity building.

Not all nations have the same capabilities or assets in space, but all would likely benefit from access to the data already being gathered by others. For example, data from an instrument on one nation's satellite might be useful for a specific purpose like forecasting flash floods, but by pairing these

observations with data from instruments on satellites operated by foreign counterparts, that nation can monitor the entirety of its water resources. Through coordination, CEOS is working to make sure that duplicative EO missions occur as little as possible and that the existing EO data are used to their full potential.

While CEOS focuses on the larger topic of the coordination of satellite-based EO missions, the WGCapD focuses on global coordination of capacity building efforts associated with those missions. While there are many Members, Associates, and partners of CEOS that operate individual capacity building programs, there is not one single entity, due to technical, political, or financial constraints, that can address all the EO capacity building needs that exist. As such, cooperation of capacity building programs can help multiply individual efforts, fill in gaps, and reduce redundancies.

The WGCapD facilitates this cooperation, working to make sure that all countries, especially those that are under-served, have access to the information that they need from sources across the globe, as well as the capacity needed to utilize that information. With EO information in hand and the ability to use that data, government leaders in all countries can make sound decisions that help to create, enforce, and sustain international environmental conventions, while simultaneously supporting socioeconomic development.

Although the majority of EO space assets are owned and operated by governments, there are a number of multilateral institutions, like UNOOSA, and NGOs, like SWF, that have an interest and expertise in EO capacity building activities. The multilateral institutions contribute a great amount of institutional knowledge and have programs that can be paired with or used as examples for future EO capacity building efforts. NGOs have access to human and financial resources that the individual governments might not have readily available. They also offer different perspectives on policies and provide expertise in areas that government entities cannot.

The coordination and cooperation of multilateral institutions, NGOs, and the space agencies is integral to establishing a cost effective, efficient, and successful EO capacity building effort worldwide. The goal of the WGCapD is to facilitate this cooperation, helping ensure that under-served countries will have the resources and capacity available that is needed to create, sustain, and enforce well informed environmental policies.

Section 3: Implementation

The WGCapD is planning implementation activities that seek to expand knowledge of, access to, and capacity to utilize EO data in under-served communities. One specific activity will be explored in this section and will be used to demonstrate the advantages of intergovernmental and NGO collaboration.

The WGCapD Digital Elevation Models (DEMs) Development Project aims to deliver elevation data to under-served communities through regional capacity building workshops. The high quality

elevation data is not available in the public domain, but will be released to relevant U.S. agencies. These U.S. agencies, namely the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), and the National Aeronautics and Space Administration (NASA), are tasked to deliver the data to recipient countries through capacity building workshops. Partnering with fellow WGCapD member agencies, as well as other organizations such as SWF, UNOOSA, and RCMRD, enables U.S. agencies to draw on additional expertise and share the burden of funding, logistical planning, agenda setting, and tailored product development. Together, they will plan and host the first capacity building workshop at RCMRD in Nairobi, Kenya, in early 2013.

Each partner organization contributes what it can to the collaborative effort. A few organizations are able to contribute funds, which will be used to finance the workshop itself, as well as to provide travel support for workshop participants unable to secure funding from their own country. Other organizations are contributing expertise and manpower. Their own employees will dedicate time to developing tailored data products to be used for training and, after the workshop, by participants back in their own countries for implementation activities– such as flash flood modeling and land use planning. In some cases, these agencies will even send experts to the workshop, to provide hands on training. All partnering organizations are able to participate in every step of the workshop planning process, no matter what shape their tangible contribution takes.

Section 4: Lessons Learned

The DEMs Development Project demonstrates how EO data can be made available to those who need them through a cooperative effort. If not for the WGCapD, the data would likely never be accessible to or usable by many countries that could truly benefit from it. This particular experience encapsulates many of the elements and challenges of EO Data Democracy and capacity building efforts and can lend lessons to future initiatives.

First, the DEMs Development Project illustrates how EO data owned by a single nation can be used in applications that extend far beyond that nation's borders. Through this project, the CEOS WGCapD will take previously unavailable data, owned by a single nation, and deliver it to those who could benefit from it, thereby advancing Data Democracy through cooperation. The Shuttle Radar Topography Mission (SRTM) 2 data is the sovereign property of the nation who funded and fielded the EO mission, the United States. For a variety of reasons, the United States cannot make the data freely and publicly available to all, but recognized an opportunity to deliver the data to under-served communities in a controlled and purposeful way through its agencies, NOAA, USGS, and NASA, and their membership in the CEOS WGCapD. Many may be deterred by the term data democracy, fearing it requires nations to share valuable data gathered through expensive EO space missions, but this

project demonstrates that data democracy can assume many different shapes and occur at varied levels of sharing.

Second, the WGCapD DEMs Development Project demonstrates how cooperation allows for burden-sharing. The U.S. agencies involved would be unable to unilaterally finance, plan, handle logistical planning, and execute one regional training workshop, much less multiple workshops around the world, in addition to delivering the data to the under-served communities who could benefit. In the current climate of reduced budgets and limited resources worldwide, no country is likely to take on such a responsibility alone. The CEOS WGCapD structure enables many organizations to contribute to a single effort that could not be completed by any one of them singlehandedly. Importantly, participating organizations were able to contribute to this project in a variety of ways, whether through planning, funding, or training. This flexibility encourages more cooperation, thereby leading to tangible data democracy and capacity building results.

Third, cooperation in EO data democracy and capacity building efforts can often produce a better result than unilateral action. The involvement of government agencies from around the world, multilateral institutions, and members of civil society has led to an inaugural DEMs Development Project workshop that will be tailored to the region and feature a variety of software tools and products. For example, RCMRD's involvement brings regional and local expertise, contacts, and experience hosting similar training workshops. Partnering with RCMRD also gives the workshop a local base to host the workshop, shortening travel time for participants from the countries receiving the training. The CEOS Member agencies involved have also agreed to work together using multiple software tools to develop products targeted specifically for the workshop participants.

These are just a few of the ways that cooperation enabled and improved the DEMs Development Project. These lessons learned can be extrapolated to other EO data democracy and capacity building initiatives.

Section 5: Conclusion

Satellite-based Earth Observation data are critical for informed decision making about our environment. However, it is not often easily accessible in a timely manner to the decision makers who need the information. Cooperation and coordination dramatically facilitate the dissemination and utilization of EO data while mitigating many of the issues that individual institutions face in capacity building efforts. The CEOS WGCapD's DEMs Development Project represents just one real life example of ongoing collaboration for the purposes of EO Data Democracy and capacity building. It demonstrates how partnerships, not just between CEOS member agencies, but also with other intergovernmental bodies and civil society, can amplify efforts and multiply limited resources.