

# The CEOS Data Cube

## Purpose

As explained in the Open Data Cube (ODC) white paper, the Committee on Earth Observation Satellites (CEOS) has supported the ODC initiative to provide a data architecture solution that has value to its global users and increases the impact of EO satellite data. Through its stewardship of the initiative, CEOS is uniquely able to provide substantial contributions to the ODC and to support global implementations.

Through a separate initiative, called the "CEOS Data Cube", or CDC, the CEOS organization plans to utilise its Agency resources, global partnerships, satellite data, and CEOS organizational groups to implement the ODC vision, but with a focus on CEOS objectives. Those objectives include exploitation and increased global impact of satellite data through future data architecture (e.g. Data Cubes) and provision of satellite Analysis Ready Data (ARD) products. Through the CDC, we plan to improve data access, data preparation, and data analysis for all global users of satellite data.

## Vision

It is our goal to reach operational Data Cubes in 20 countries by 2020. This goal will not be achieved by CEOS alone, but will engage a number of other stakeholder organizations and current users to achieve the goal. As of July 2017, there are 3 operational Data Cubes (Australia, Colombia, Switzerland), 4 in development (United States, Vietnam, Taiwan, Uganda) and 20 other countries with expressed interest.

Through partnerships with global stakeholders, it will be possible to support their existing projects through the deployment of Data Cubes in countries, and demonstrate the potential to meet their goals leveraging Data Cube technology to make optimal use of their resources. For example, World Bank has a high interest in Data Cubes to support a number of global water management projects. These projects use satellite data, but there is a lack of consistency and significant challenges with data preparation. Similarly, SERVIR is investigating the use of Data Cubes at its global regional data hubs. Should they determine the ODC infrastructure is an acceptable and beneficial technology for their local users, this would result in many more country-level Data Cubes, as their hubs serve many countries.

Through our current national Data Cube users, we can utilise their skills and lessons to support deployments in other countries. For example, Switzerland is considering a future capacity building project that may result in two new country-level Data Cubes (Georgia, Moldova) where they will provide the user support for deployment and training. Similarly, the United Kingdom is considering a future capacity building project that would result in three new country-level Data Cubes (Vanuatu, Solomon Islands, Nauru) for climate change monitoring in island states.

Finally, CEOS, through its Agencies and technical groups (e.g. Systems Engineering Office - SEO, Working Group on Information Systems and Services - WGISS, Working Group on Capacity Building and Data Democracy - WGCapD) will support deployment and training for new country Data Cubes. As an example of an Agency contribution, CSIRO has recently invested in a Python programmer to support Australian industry use of their Data Cube and to support Data Cube deployment to other countries in the Asia-Australia region.

## Implementation

In order to achieve the vision described above, CEOS has developed a list of key implementation steps, listed below.

- Develop and maintain a web-based user interface to demonstrate Data Cube applications
- Conduct pilot studies to test approaches and provide user feedback
- Engage global stakeholder organizations (e.g. GEO, World Bank, SERVIR) to identify country needs and provide infrastructure and funds for implementation
- Develop a group of globally distributed Python programmers who are able to support deployment and customer support

For more information, visit: <http://www.opendatacube.org/ceos>