

2020-2022 GEO Work Programme

Digital Earth Africa

1. Executive Summary

Full title: Digital Earth Africa

Acronym: DE AFRICA

Category: Community Activity

Digital Earth Africa (DE Africa) will provide a routine, reliable and operational service using Earth observations to deliver decision-ready, continental-scale products. DE Africa products will enable policy makers, scientists, the private sector and civil society to address social, environmental and economic changes on the African continent and develop an ecosystem for innovation across sectors.

Digital Earth Africa will process openly accessible and freely available data to produce these decision-ready products. Working closely with the AfriGEO community, DE Africa will be responsive to the information needs, challenges and priorities of the African continent. DE Africa will leverage and build on existing capacity to enable the use of Earth observations to address key challenges across the continent.

Digital Earth Africa will be developed and operated to deliver the following important and ambitious outcomes in Africa:

1. Countries are empowered, with national data and information relating to challenges of land, water, the environment, resources, and human population.
2. Lives are improved, through access to information that empowers governments, individuals and communities to make informed decisions and choices.
3. Development activities are more effective, through access to and use of information that improves the understanding of issues and solutions. Continental assessments, reporting, and responses are advanced through access to continental scale data and information products relevant to Agenda 2063 and the Sustainable Development Goals.
4. Digital transformation is advanced, through industry uptake and innovation using products and services from DE Africa.
5. Economic development and job creation are increased, through access to data for commercial products and services development.

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2. Purpose

The United Nations Sustainable Development Goals (SDGs) are a global effort to address social, economic and environmental challenges across all countries by 2030. These ambitious goals require new approaches in using data, creating challenges and opportunities for earth observation. A massive continent with rich and diverse environments, Africa is under constant threat from Climate Change and environmental degradation, illegal mining, land degradation, water quality decline, deforestation and food insecurity. These challenges are taking their toll on communities and ecosystems.

Changes in the way data is accessed and used is enabling a fusion of technologies that support implementation of the SDGs. New possibilities for data analytics and visualisation are emerging through the combination of human capability and advances in science and technology — including

global observing systems, computer processing power, storage capacity, Artificial Intelligence and cloud computing. However, despite these advances there remain major barriers to earth observation delivering its full potential to improve decisions. Finding, accessing and processing earth observation data to produce decision-ready information remains a struggle for many countries.

The Data Cube (www.opendatacube.org) was first developed and operationalised in Australia (www.ga.gov.au/dea), where it is transforming the use of earth observations in government decision-making and private sector innovation. The Committee on Earth Observation Satellites promoted its use to other countries as a Cloud-based, open-source, data processing earth observation analytics platform. Earth observation Data Cubes are now being used worldwide to unlock vast archives of satellite data, allowing users to extract insights and information from these observations. Data Cubes provide an environment in which algorithms can be rapidly developed and applied to generate information products from the full earth observation time-series at continental scales.

Much of the data used in Data Cubes is freely available, but Data Cubes reduce the data preparation and processing burden by at least 80%, allowing remote sensing experts to focus their attention on solving problems, rather than wrangling data. The Data Cube allows routine processing at continental scales with full resolution, moving earth observation into an operational role. Full time-series of images are accessed, producing more accurate and detailed information, and allowing processes to be visualised and understood. However, so far, Australia's is the only continental-scale Data Cube.

Digital Earth Africa will develop a continental-scale Data Cube for Africa, providing a routine, reliable and operational service enabling African nations to track changes across countries in unprecedented detail. With a land area of over 30 million square kilometres, four times as large as Australia, DE Africa will be the world's largest continental Data Cube.

3. Key Activities

The key activities to be achieved for the 3 year establishment of DE Africa are outlined below.

Setting the foundation (Year One)

- Develop the governance framework, mission and vision
- Implement the governance framework
- Establish institutional hosting arrangements and DE Africa Office
- Recruitment of DE Africa Office staff
- Deliver DE Africa Day and key events
- Deliver continental-wide beta water observations from space product
- Develop key strategies: Communications and stakeholder engagement, partnerships, and capacity building
- Establish key partnerships with in-country enablers and others
- Ensure alignment with relevant initiatives, programs and institutions
- Undertake Australian Government Investment Design process
- Develop technical roadmap
- Build the DE Africa data and ODC infrastructure

Building capacity and uptake (Year Two)

- First DE Africa Annual Users Meeting

- Implement technical roadmap
- Deliver 3 continental-wide products
- DE Africa Office operating and fully staffed
- Regular training and capacity building program in place
- Engage at the country level on uptake of DE Africa products
- Increase the ability for African countries to exploit DE Africa products and services
- Produce a study on the economic value of EO data for Africa
- Increase comprehensive stakeholder engagement
- Secure co-investment from additional philanthropic/aid agencies

A developing ecosystem (Year Three)

- Deliver 5 continental-wide products
- Deliver case studies on the impact of EO data on decision making in Africa
- Demonstrate a developing business case for direct country-level investment based on delivered value
- Demonstrate cases of products and services from DE Africa being independently ingested into new, innovative applications
- Develop a sustainability plan for the continued operations of DE Africa

4. Relationship to GEO Engagement Priorities and to other Work Program Activities

Digital Earth Africa data and services have untapped potential to help address environmental challenges and development priorities, and to progress national and continental policy frameworks, including the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, and Agenda 2063 — Africa’s master plan for transforming the continent into the global powerhouse of the future. DE Africa will also support all of Africa to drive progress towards the UN 2030 Agenda for Sustainable Development. In particular, it will be directly relevant to Goals 2 (zero hunger), 6 (clean water and sanitation), 9 (industry, innovation and Infrastructure), 11 (sustainable cities and communities), 13 (climate action), 14 (life below water) and 15 (life on land).

DE Africa will align with major GEO activities, initiatives and flagships, including GEOGLAM and GFOI, to increase their impact. Through the DE Africa platform these and other programs will be able to deliver products and services at full resolution and at continental scales. Similarly, DE Africa will engage with the early development of indicators such as Land Degradation Neutrality so that these products and services can be delivered through DE Africa.

Digital Earth Africa will benefit government, businesses, NGOs and individuals in their day-to-day decision-making.

5. Governance

Digital Earth Africa has a Governance Framework that consists of a Governing Board, Technical Advisory Committee (TAC) and the Stakeholder Community Group (SCG). The Governing Board is at the highest level. The Governing Board and the TAC provide advisory support to the Coordinator of the DE Africa Program Office. The SCG is managed by the Program Office and is a group that the TAC can leverage for working groups or otherwise as needs develop in the future and as the SCG matures into a Community of Practice. The institutional host for DE Africa will provide fiduciary and administrative support to the program including management of the DE Africa Trust Fund and hosting the DE Africa Program Office core staff. The DE Africa Program Office will consist of the Coordinator for DE Africa along with core staff needed to run and manage the DE Africa program.

The Coordinator is accountable to the Governing Board for the delivery of the work program. The Coordinator takes guidance from the TAC and gives direction to the Program Office.

The Governing Board will provide strategic guidance, oversight and accountability to ensure successful achievement of the mission and vision of DE Africa including policy guidance, alignment and prioritisation, and uptake and use of data products at the national and other levels. Board membership is intended to reflect diversity and expertise consistent with the mission of DE Africa, and include members at the highest levels within each organisation when appropriate. Board members will bring their collective experience, knowledge and networks to provide strategic guidance to benefit DE Africa.

The Technical Advisory Committee is inclusive of respected subject-matter-experts who can provide rigorous and practical guidance on the overall technical program for DE Africa. This may include the latest technological trends and emerging issues on topics related to the use of geospatial and earth observation data. The TAC also includes domain experts and practitioners who can provide guidance on how DE Africa, for example, can be applied to agriculture, climate change, poverty, the SDGs, etc. and the most effective ways to engage with down-stream communities to deliver maximum impact. The TAC will also ensure alignment with other programmes and initiatives across Africa that can benefit from DE Africa (or vice versa) such as AfriGEO and GMES Africa. This will especially be important for country engagement and capacity building.

The Stakeholder Community Group (SCG) will provide a voice to a wider range of organisations than those in the immediate governance structure, providing DE Africa with the breadth of perspective and engagement that will be necessary to achieve impact and growth to a sustainable service. The SCG will provide increased diversity of representation, across sectors, domains, gender, geography and data communities.

6. Data Policy

Digital Earth Africa will be developed as a continental data-cube for Africa in an operational environment, using the Open Data Cube software leveraging Digital Earth Australia expertise to achieve early progress, making analysis-ready satellite images and decision-ready products reliable and accessible. Developed methods and procedures comply with the GEOSS Data Sharing Principles and the GEOSS Data Management Principles.

Some of the guiding principles of DE Africa relevant to data policy are:

1. Continental-scale data, products and operational services. DE Africa will provide an operational service delivering data and products available for the entire continent.
2. Open and free data. DE Africa will be a public good providing free and open data and products to all its users.
3. Incorporate domain expertise. DE Africa will provide data products useful for agriculture and food security, water access and quality, deforestation, mining, disaster response, climate change, and more.
4. Agile, nimble and action oriented. The intent of DE Africa is to actively deliver, adapt and iterate as needed, and to develop existing capacity to make a real-world difference.
5. Interoperability. DE Africa will be based on an open data infrastructure and FAIR2 principles to ensure DE Africa can connect with other platforms and infrastructures to share data, products and algorithms.
6. Privacy and Integrity. DE Africa will ensure that privacy concerns of personal data and those data with national and regional security concerns are handled with integrity and confidentiality according to internationally accepted standards and protocols.

Table

Confirmed Contributions

Contributing Organisation
The Leona M. and Harry B. Helmsley Charitable Trust (US\$10M)
The Australian Government (AUD\$10M)