AFRICA EARTH OBSERVATION CHALLENGE

COMPETITION BRIEF

The Africa Earth Observation (AEO) Challenge is an annually run open innovation challenge that has been sourcing novel space technologies since 2016. The aim of this challenge is to drive entrepreneurial activity in the African space industry and promote awareness of the value of earth observation data (EOD) across the continent, and in multiple sectors such as water and food security, mining, logistics, insurance, and many more.

There are two questions that we would like to answer through this challenge

1 How might we enhance and improve various industries, such as smart cities, logistics and agriculture, to name a few, through the innovative application of earth observations?

2 How might we do this through utilising big data analysis techniques, artificial intelligence, machine learning and cloud computing?

These questions have and can be answered through applications of EOD across various industries

Some potential areas of application that have been identified and included in this brief include the following:

Smart cities

Logistics

Food security

The adoption of emerging technologies that employ EOD is at the heart of smart city development

Smart cities:

Through employing EOD, various emerging technologies, such as big data, the internet of things (IoT) and artificial intelligence enable the development of smart infrastructure, which is key to the 'smart' transformation of cities.

For this challenge, how can you utilise EOD to solve a problem or provide improvements in the smart city development? To the right are just some of the possible applications.

Traffic Monitoring

Urban Planning

Air and Water Quality Monitoring

Sustainable service delivery

Land and Marine Monitoring

Disaster Management

Infrastructure monitoring/ Smart Infrastructure

The transportation of both people and goods has become more efficient through the adoption of EOD in the logistics industry

Logistics:

EOD has transformed the transport and logistics industry in various ways, and given rise to e-hailing organisations such as Uber, Bolt and Little Cab (Kenya).

For this challenge, how can you utilise EOD to solve a problem or provide improvements in the logistics industry? To the right are just some of the possible applications.

Delivery Drones

Monitoring Hazardous Goods

Cargo Monitoring

E-hailing

Speed Sensors

GPS and Tracker Systems

The application of EOD in food security has grown and is quite vast, including some of the following examples

Food security:

The application of EOD can provide valuable insights in agriculture, particularly for small scale farmers, enabling better decision-making and driving development, growth and sustainability in the industry.

For this challenge, how can you utilise EOD to solve a problem or provide improvements in the agricultural industry? To the right are just some of the possible applications.

Water Resource Management

Crop Health Detection

Fishery Sustainability

Soil Type Mapping

Yield Estimation

Drought and Flood Risk Mitigation

Precision agriculture

Regulation & Legislation Compliance

Weather Forecasting

Agricultural Planning

The challenge will run over six weeks, followed by business development training, and concluding with a final pitching event in November

Challenge Webinar

Business Development Training

Online Incubation & Virtual Mentorship

Challenge Launch

Challenge Close

Final Pitching Den

w/c 6 September

11 – 22 October

January - April 2022

16 August

26 September

5 November

*w/c: week commencing

Who are we looking for this year's EO Challenge?

Submission from businesses in any and all industries are encouraged, as long as they meet the following criteria :
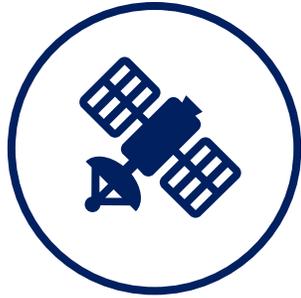
EOD application:
All submissions must demonstrate a clear application of EOD

Business Location:
The Challenge is open to businesses across the African continent

Business development level:
Businesses that are at the seed stage, early development or investor ready (*TRL 8/9 and *BRL 1/2/3)

*Technology Readiness Level (TRL) – See appendix
*Business Readiness Level (BRL) – See appendix

All submissions will be judged according to the criteria listed below

Criteria	Description
Solution uses Earth Observation Data in an innovative manner	Solution uses Earth Observation Data in order to reach the goal stipulated. It can be used at any stage of the process.
Contribution to the relevant industry	The solution provides a clear, meaningful impact in the industry that it is being applied in. There is possibility for the solution to be scaled.
Ease and sustainability of implementation, with all possible impacts considered	An implementation strategy must be included, with sustainability and ease of the strategy noted. All potential positive and negative impacts of implementation must also be considered.
Feasibility of solution	The solution / application has a proof of concept and any additional R&D or technological requirements are known.
Viability of solution	The solution can be used in a business model and can be profitable.
Team capability and intent	The team is passionate and dedicated to the solution; and are able to solve problems effectively.

*The scoring will be equally weighted across all criteria

What's in it for the winners?

There are various prizes that will be up are for grabs for the Challenge finalists, including:

Data packages	AWS Credits	Incubation & mentorship	GEO Week '21 participation	Media publicity	Technical Support
Challenge finalists stand a chance to win Maxar Earth Observation Data packages worth up to $20,000	Up to $12,000 worth of Amazon Web Services Activate credits will be available to the Challenge finalists	4-month online incubation and virtual mentorship to the value of $24,000 from GEN Space, DEA & AWS, including one-on-one mentorship from AWS' Director of Chief Technologists, Tom Soderstrom	Finalists will have the opportunity to participate in, grow their network and gain exposure at the 2021 Group on Earth Observation (GEO)Week and gain exposure	Challenge finalists will have the opportunity to feature in interviews and editorials by Challenge Media Partner Space in Africa	Technical support will be available to the Challenge participants from the leading EOD specialising organisations including SANSA, Maxar, AWS and DEA

What technology do the Partners have to offer?

There is a range of technology that challenge finalists will have access to, through some of the challenge partners, including:

• Data cube technology (for high resolution and medium resolution imagery)*

• Analysis Ready Data (ARD)*

• Simple Storage Service (S3) bucket capacity*

Participants are encouraged to "think big" and make use of the aforementioned technology in their submissions – scalability is not required, but desired.

The challenge partners, namely, Digital Earth Africa, Amazon Web Services, SANSA and Maxar have pioneered this technology and are willing to share their expertise, data and platforms, as well as all necessary support with the shortlisted companies.

*See appendix for more information

Challenge technical support

There will be technical support available at each of the stages of the change, as outlined below:

1   **Submission phase (16th Aug – 26th Sep 2021)**
The webinar will be the main mechanism by which entrants will be able to learn about the technology that is on offer, and how it can be used to enhance solutions. Any questions following the webinar can be sent through to info@eochallenge.africa.

2   **Business development training and pitch preparation (11th Oct – 4th Nov 2021)**
During this phase Challenge finalists will have the opportunity to refine their business models and pitches, as well as have access to various partners for individual technical support.

3   **Online incubation and mentorship: roll-out (Jan – April 2021)**
The top finalists will receive access to specific technologies (relevant to each) and one-on-one coaching on applying these, as well as mentorship from the various Challenge partners, such Amazon Web Services' Director of Chief Technologists, Tom Soderstrom.

Submission information

Complete your submission at: https://eochallenge.africa/

26 SEPTEMBER 2021, 12AM (CAT)

A template of the AEO Challenge submission form

is available for download on the AEO Challenge.

Please complete this form and submit it as a pdf in the online submission form

For any queries, please email

info@eochallenge.africa

Submission checklist

✓ Submissions must be complete with the AEO Challenge submission form template found on the website and submitted in pdf format through the form on the website.

✓ Any additional documents / materials need to be included in this document.

✓ Once completed, upload the AEO Challenge submission form as part of the online submission, along with the other required details.

✓ Final submission date is **26 SEPTEMBER** – nothing will be accepted after this date.

✓ Check if your submission matches the judging criteria. You can score your submission yourself with the criteria given in the brief.

✓ If you have any questions or queries, do ask.

✓ Enjoy the submission! ☺

Challenge Webinar

We will be hosting a Challenge Webinar week commencing 6th September 2021 to provide more information on the Challenge, the different technologies that are on offer, prizes, interviews with previous Challenge finalists, Q&A session and much more!

For more information visit eochallenge.africa

Additional resources

BEGINNER BUSINESS TOOLS

- The Business Model Canvas
  - All the building blocks of your idea on one page – it will help you assess what key parts are missing to make your solution a success
  - Business model canvas videos (6 episodes)
- THE DVF Framework
  - A tool to help you find your 'innovation sweet spot' – it will lower your risks when opening your business

ADDITIONAL INFORMATION

- Africa's Increasing Government Investment in Space
- African Space Industry Revenue to Surpass USD 10.24 billion by 2024 Despite COVID-19 Setback
- Egypt to launch two space research satellites in 2022
- Kenya Space Agency to launch nano-satellites and rockets in August

Disclaimer

The intention of this challenge is to identify promising social and technological innovations that could be implemented on the African continent.

No stake/equity in your business will be required by the implementation partner, so It is important that no confidential intellectual property or information be disclosed through this process. This may include pre-existing software, processes, systems or market research that is not publicly available. However, should that become an option in future, the necessary steps will be followed.

By submitting a response, you represent that your response does not, and will not be deemed to, contain any confidential information of any kind whatsoever. SANSA, ZASpace and its project partners will not be held liable for the loss of any intellectual property.

In the event that your solution is selected, if required, a non-disclosure agreement or other appropriate legal documents will be signed to protect your interests.
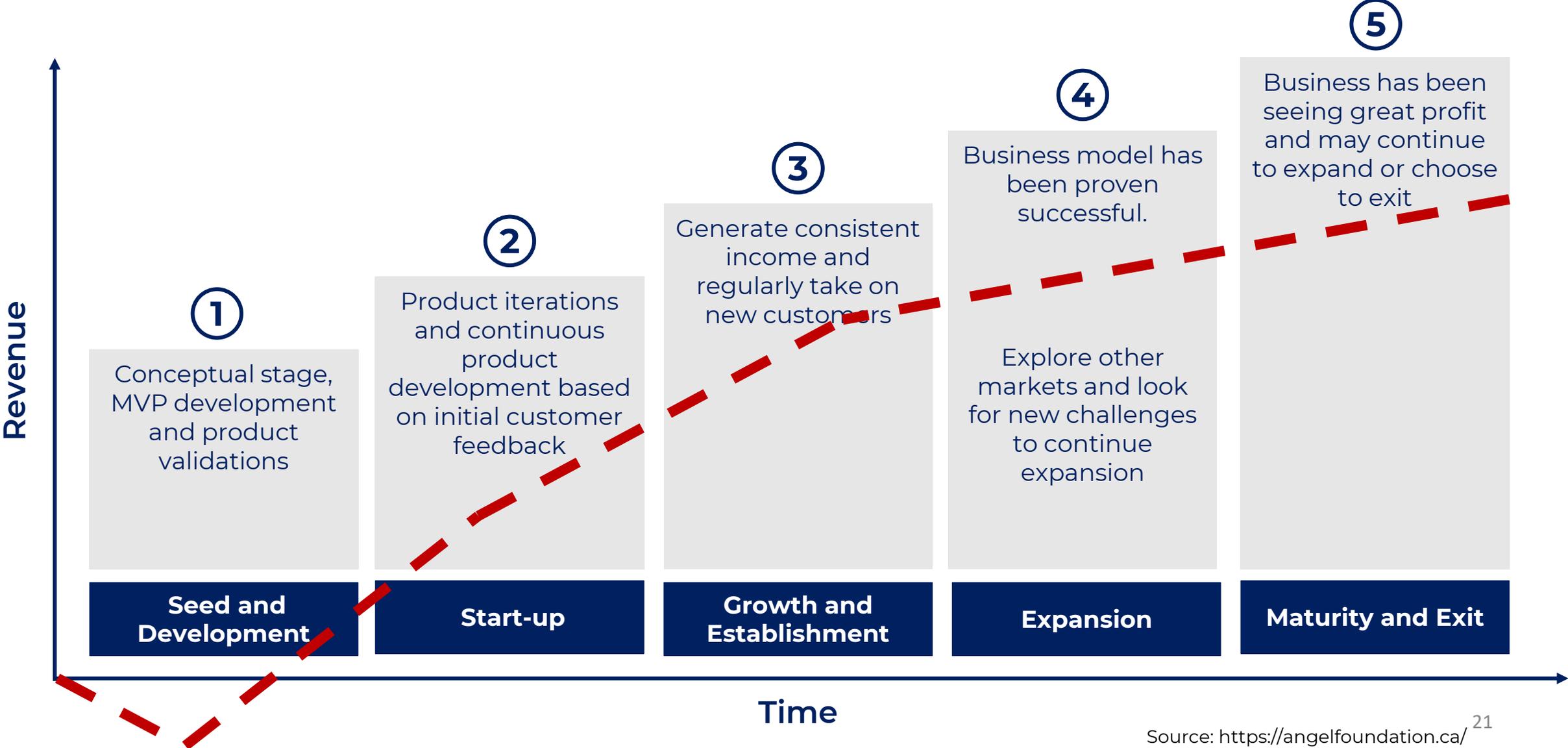
Appendix

Technology Readiness Level

For this Challenge we are looking for businesses that are at the 'deployment' technology readiness level (TRL), specifically TRL8 or TRL9.

Source: https://frontiersi.com.au/trl/
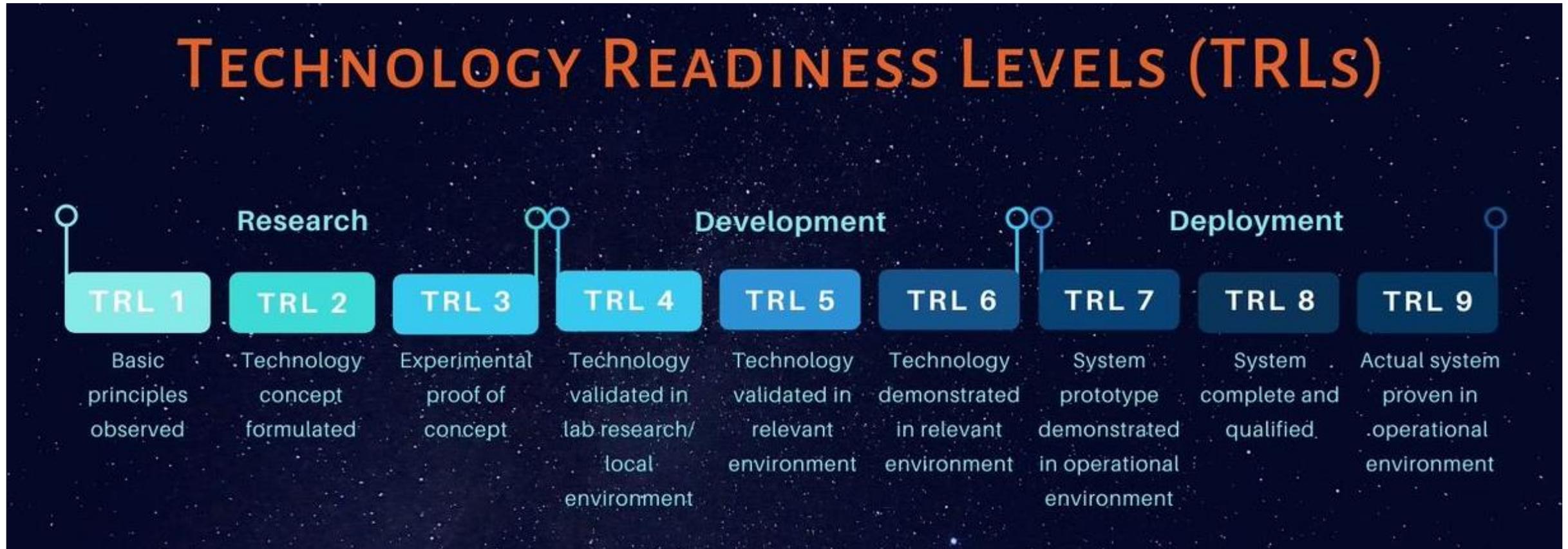
Business Readiness Level

For this Challenge we are looking for businesses that are at the 'seed and development', 'start-up' and 'growth and establishment' levels.

Revenue (y-axis) / **Time** (x-axis)

① Seed and Development — Conceptual stage, MVP development and product validations

② Start-up — Product iterations and continuous product development based on initial customer feedback

③ Growth and Establishment — Generate consistent income and regularly take on new customers

④ Expansion — Business model has been proven successful. Explore other markets and look for new challenges to continue expansion

⑤ Maturity and Exit — Business has been seeing great profit and may continue to expand or choose to exit

Source: https://angelfoundation.ca/

Data cube technology

What is it?

A data cube is used to represent the specific information to be retrieved from a larger set of complex data. It makes retrieving the most relevant or important information easy.

Partner offering:

Digital Earth Africa data cube technology is operational, using AWS based in Cape Town, providing analysis ready data and services to users across Africa.

Challenge partners, there is an opportunity for finalists to access already existing data cubes (DE Africa) to build new data cubes based on high resolution data provided by Maxar and combine with the existing data cubes is technically feasible.

Analysis Ready Data (ARD)

What is it?

Satellite imagery that is prepared for a user to analyse without having to pre-process the imagery – it is data that is ready for analysis. ARD essentially allows users to skip the rather demanding data preparation step altogether.

Partner offering:

Digital Earth Africa provides access to analysis ready Landsat, Sentinel-1 and Sentinel-2 datasets (in cloud optimised format and with STAC metadata) and associated services to enable new applications, quickly.

Access to high resolution data will be provided by Maxar for the Challenge finalists, which can be combined with public good datasets from DE Africa data cubes.

ARD, combined with the power of cloud compute, enables start-up companies to test ideas and offer operational services faster than before.

Simple Storage Service (S3) Bucket

What is it?

S3 is an object storage service, developed by Amazon Web Services, that offers industry-leading scalability, data availability, security, and performance. It is a public, cloud storagee resource that offers various storage tiers

Partner offering:

S3 bucket capacity will be provided by Amazon Web Services.

Combining these technologies enables innovative solutions to solve problems and offer new services

For example, Digital Earth Africa offers following tools and services to enable private sector partners develop innovative solutions:

- DE Africa Sandbox is a cloud-based data science platform (a Jupyter Python environment)
- Repository of readily available notebooks (user computational workflows and code) will allow users to use, interact and engage with the DE Africa Sandbox

- OGC Web Services delivers DE Africa data through standard Application Program Interfaces

- Digital Earth Africa (DE Africa) Map is a website for map-based access to spatial data.

- Training and Help - self guided training course to learn and master above tools!

Solutions in the past years have been received across various industries, such as agriculture

Agriculture:

Smart AgrIoT – South Africa

Smart AgrIoT is a cloud-based digitisation and farm management platform for smallholder farmers to promote precision agriculture solutions, including data gathering by satellites and drones, weather information and soil sensors as well as other data-driven farming practises. They aim to build a world with no poverty or hunger by providing low-cost solutions that enable smallholder farmers to meet the needs of their direct and broader communities.

FieldDev Group Nigeria – Nigeria

FieldDev Group Nigeria is an agribusiness-focused geographic information systems (GIS) mapping provider. Their flagship is a web-based geospatial analysis tool that provides a fast, precise, and easily repeatable way for smallholder farmers farming collectively in geo-cooperatives to divide up their shared land expanse into smaller adjacent plots, whose sizes match each farmer's pre-established acreage need. The tool reports back high-res coordinates of each farmer's plot boundaries in under a minute and eliminates the need to physically scout every single plot within an expensive GPS device or other traditional survey equipment.

Logistics and insurance, across various African countries

Logistics

HeHe – Rwanda

Hehe aims to create a post-harvest logistics platform using remote sensing technology to forecast and match demand and supply. Through this, they are enabling manufacturers, distributors, and retailers to reach the end consumer conveniently while unlocking access to a variety of goods and services on demand.

Insurance

Afro Emotikon- Nigeria

Afro Emotikon is an artificial intelligence company that uses native facial marks called tribal to proper insurance policy for people in future of space resettlement plan and vacation.
We use facial description technology as Virtual reality to create Insurance regulatory technology for parents to transfer ownership of the premium as inheritance of space low orbit land to their future generation.