



Made in Africa by African

AFRICAN DEVELOPMENT SATELLITE-

An Initiative for Climate Change Detection In Africa

Prof. Mohamed Kalil Iraqi Deputy
CEO OF THE Egyptian Space Agency
mkhalil@cu.edu.eg



AGENDA

- The objective of Af.Dev.Sat
- Space mission.
- Why Africa needs Af.Dev.Sat
- Project scope.
- Mission preliminary specifications
- Project phases.
- Needed support.

AFRICA POTENTIALS

- Africa has the world's fastest growing population (African development bank)
- By 2030 Africa is projected to have about 1/3 of the world population (UN department of economics and social affairs)
- Our continent has enormous potential, not only to feed itself and eliminate hunger and food insecurity, but also to be a major player in global food markets. (NEPAD)
- Transforming agriculture in Africa is key to a more peaceful world (UN development programme)
- Africa is heading towards the next technological revolution (The African Exponent)



AFRICAN CHALLENGES

Africa have many challenges :

- technology transfer
- low resilience to natural disasters,
- need to develop better disaster response mechanisms,
- adverse impact of climate change,
- increasing water scarcity,
- desertification,
- food crisis,
- trafficking and piracy,
- non achievement of the Millennium Development Goals (MDGs),
 - to eradicate extreme poverty and hunger;
 - to achieve universal primary education;
 - to ensure environmental sustainability; and
 - to develop a global partnership for development.



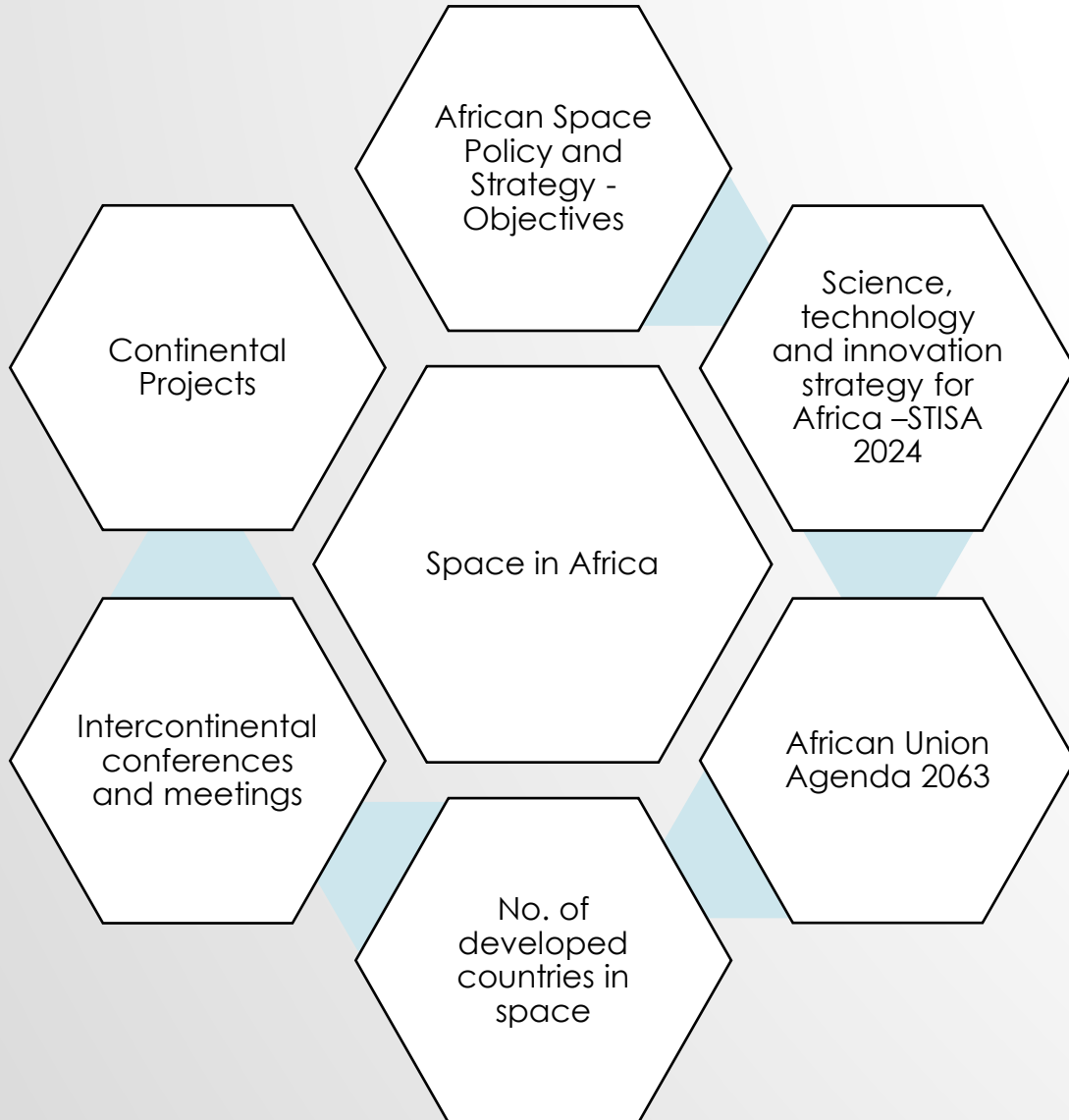


AFRICA DEVELOPMENT

- **Space education and Technology transfer**
- **Earth observation (EO)**
 - Disasters monitoring
 - Climate change monitoring
 - Water and Agriculture



SPACE FOR AFRICA?



Space Technology?



AFRICA DEVELOPMENT SATELLITE INITIATIVE

- Initiative announced by the **H.E Egyptian Minister of High Education and Scientific Research** at TICAD-7. August 2019

“African development satellite” initiative aims at gathering African nations to develop space system for climate change monitoring and capacity building.

- Announced at “The **United Nations Commission on Science and Technology for Development (CSTD)** November 2019”
- 8th African Leadership congress 2019





ABOUT THE INITIATIVE

- The initiative is being an action taken by the **Egyptian Space Agency (EgSA)**, as a responsible member of Africa space arena.
- The initiative aims at implementation of a series of small EO satellite with African capabilities and infrastructure to help address the main challenges of Africa





AfDevSat to promote the AFRICAN SPACE COLLABORATION

- **Capacity building:**
 - To **promote level of knowledge** and build **human** capacity (investment in people)
 - To enhance level of **African space industries.**
 - To **build infrastructure** in the participating countries such as ground station, and laboratories
- **To create a sustainable collaboration platform** within African countries in the field of space technology and applications- under the framework of **African Space Agency.**
- **To respond to regional, continental and global strategies** including (African Space Policy and Strategy, announcement of African Space Agency, STISA 2024, Africa Union Agenda 2063)
- **To utilize the developed satellite series** in over coming the majority of Africa challenges together





KICKOFF MEETING FOR THE FIRST SATELLITE PROJECT



African Development Satellite Initiative
Statement Declaration
Cairo, 28 November 2019

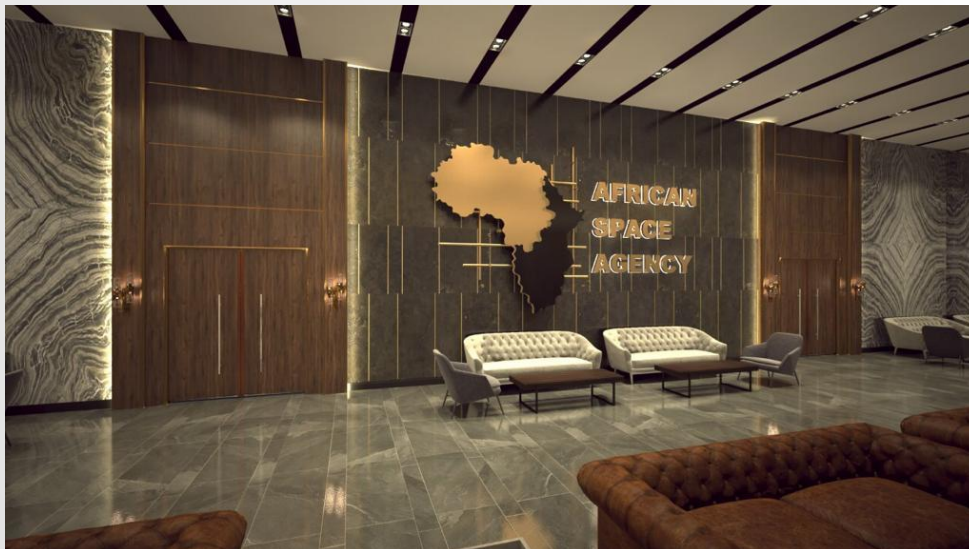
- Egypt, Sudan, Kenya, Nigeria, Ghana and Uganda met at EgSA (27-28 Nov. 2019), Cairo.
- Cairo Declaration of the project was signed



African Space Agency

This project initiated as a platform for intra-continental collaboration in space arena.

Egypt is hosting the HQ of the African space agency



INITIATIVE OBJECTIVES

- **To build a small satellites**
- Each satellite subsystem will be built in one of participating countries.
- The initiative shall develop and launch several EO satellites
- The missions targets
 - climate change detection and study of its effects on African countries
 - Disaster monitoring
 - Agriculture and water resources monitoring and management
- Integration will be carried out for Engineering model and Flight Model.





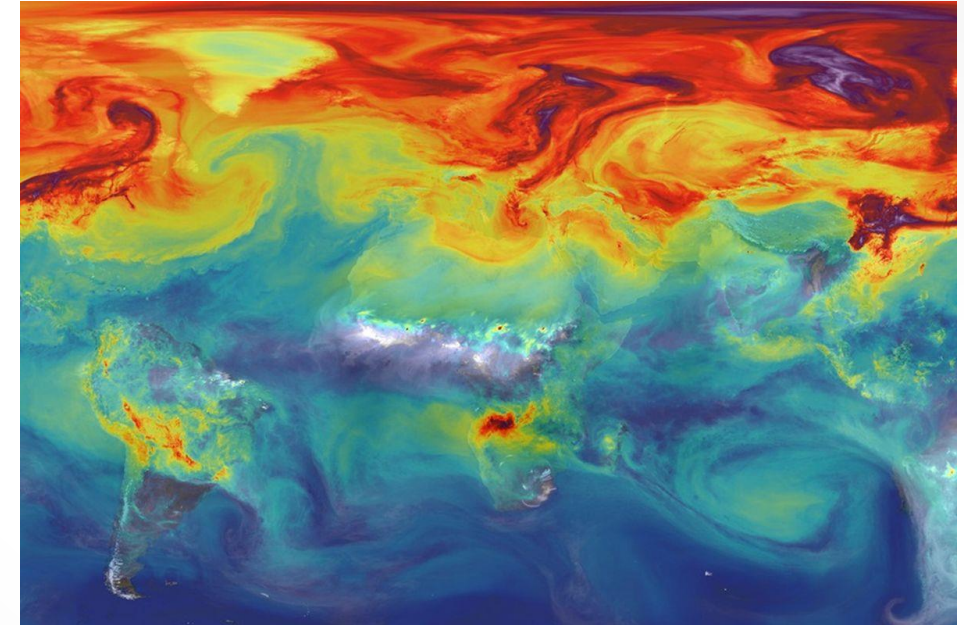
AFRICAN DEVELOPMENT SATELLITE

- The initiative is being an action taken by the Egyptian Space Agency- EgSA, as a mandate for the hosting Egypt for the African Space agency.
- The project aims at implementation of space system (satellite and ground station) with African capabilities and infrastructure.
- The project empowers African space industry non-dependency.



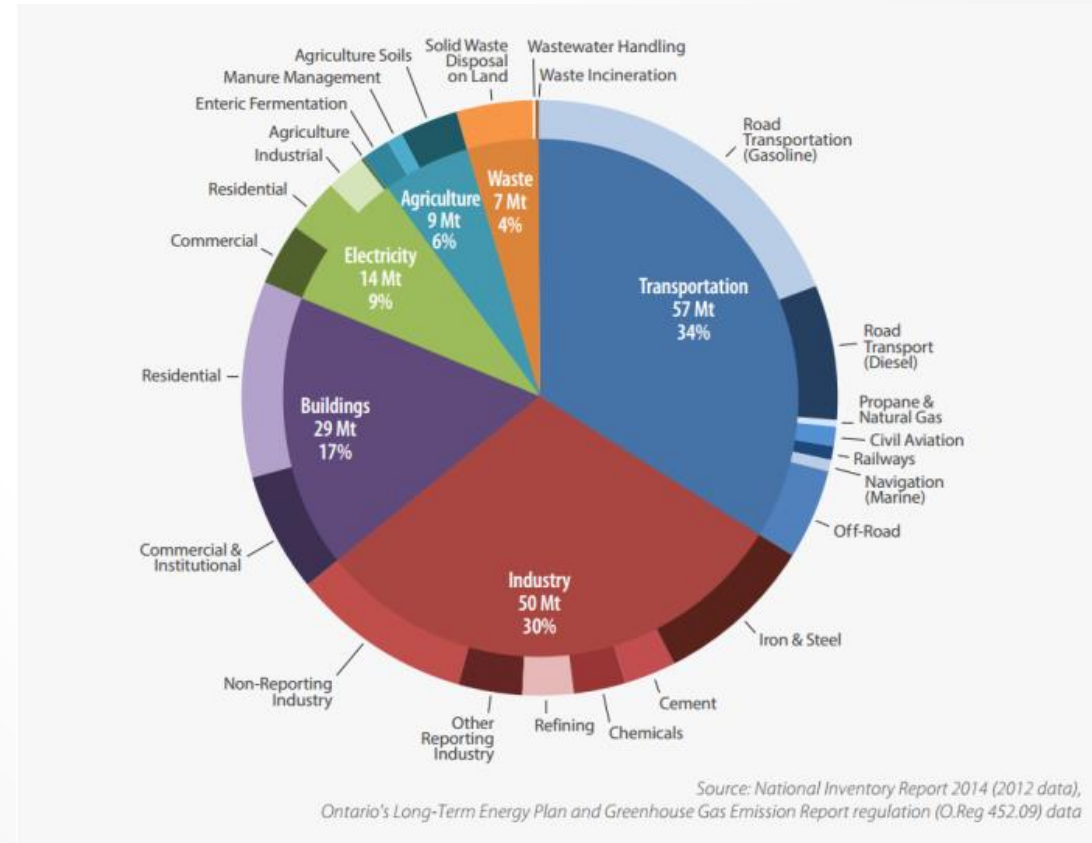
SPACE MISSION

- The project mission is to:
 - Monitor the climate change phenomena across African continent.
 - Demonstrate the human capabilities in Africa to develop satellite mission.
 - In-orbit technology demonstration for African subsystems



WHY AFRICA NEEDS AF.DEV.SAT ?

- The climate change is one of the main challenges for the upcoming decades.
- the devastating effects of climate change, from longer periods of drought, more frequent wildfires and loss of sea ice to an increase in the number, duration and intensity of tropical storms, are being felt around the world with an intensity that underscores the immediate need for concerted efforts.
- In March and April 2019, cyclones tore through the Southern African countries of Malawi, Mozambique and Zimbabwe, taking the lives of hundreds and injuring and displacing thousands.
- According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), the natural disaster affected more than 1.9 million people across the region, most requiring humanitarian assistance



WHY AFRICA NEEDS AF.DEV.SAT ?- CONT.

- The Climate for Development in Africa (ClimDev-Africa) Programme is an initiative of the African Union Commission (AUC), the United Nations Economic Commission for Africa (ECA) and the African Development Bank (AfDB).
- It is mandated at the highest level by African leaders (AU Summit of Heads of State and Government). The Programme was established to create a solid foundation for Africa's response to climate change.
- Beyond the AUC-UNECA-AfDB partnership, the Programme works closely with other African and non-African institutions and partners specialised in climate and development.



MISSION DEFINITION

- To observe CO_2 and CH_4 emission across African continent.
- In-orbit technology demonstration for African space systems.



PROJECT SCOPE

- the project consists of two main parts:
 - Space segment
 - Satellite systems will be built by each participating country.
 - Detailed training will be provided to teams.
 - Orientation training will be provided to each technical team.
 - System integration and testing will be provided.
 - Ground segment
 - Ground station will be built in each participating country.
 - GS will be connected together.



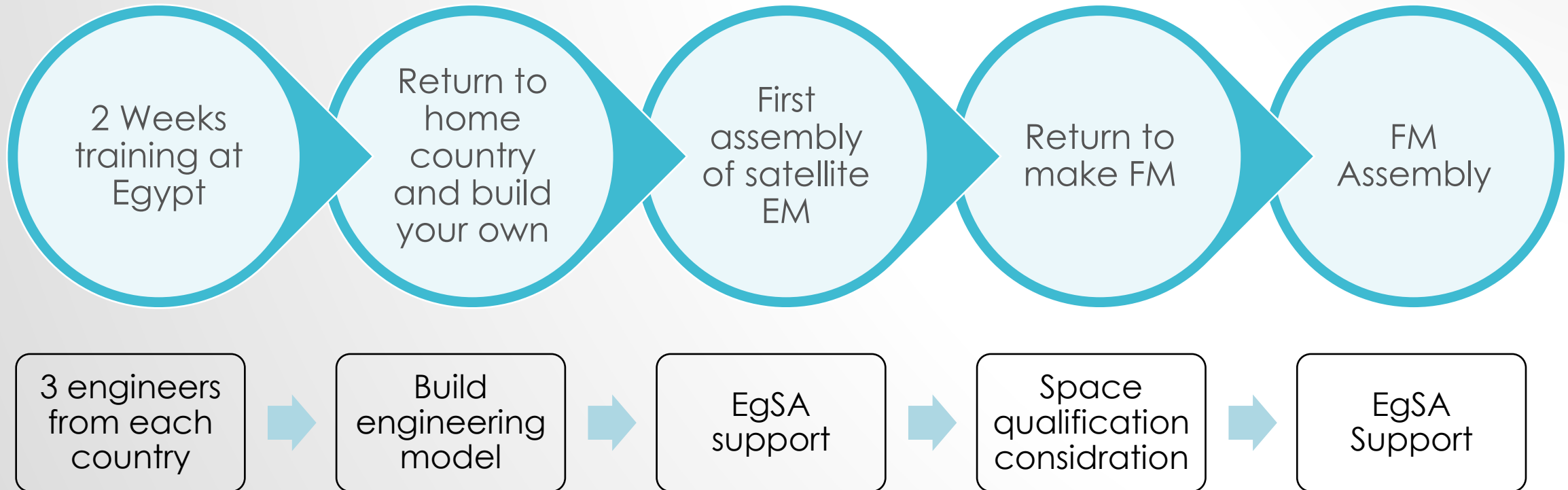


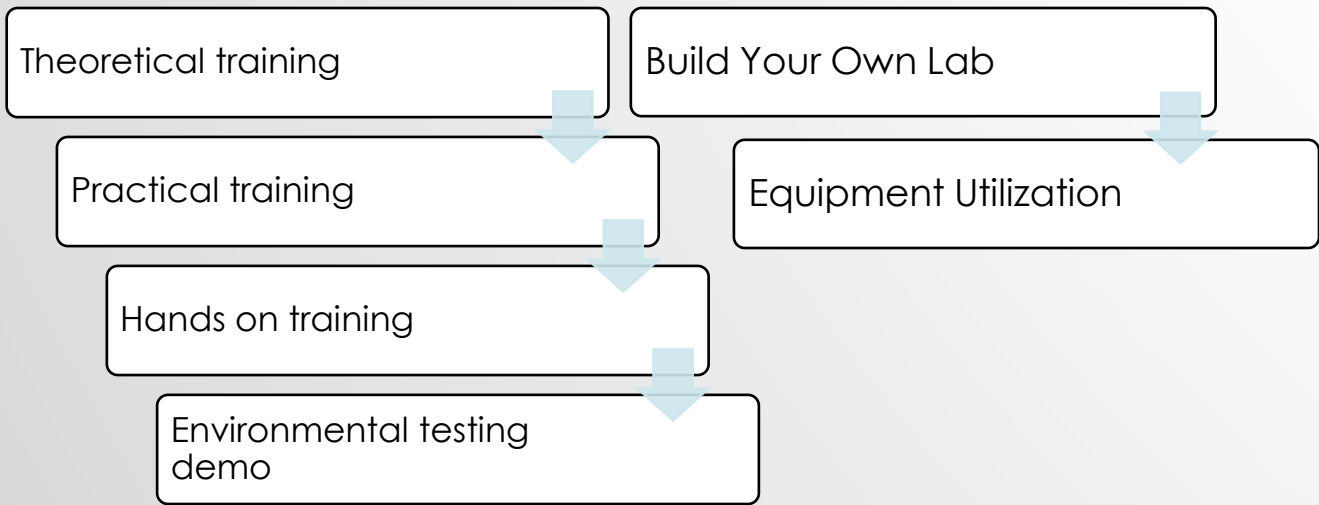
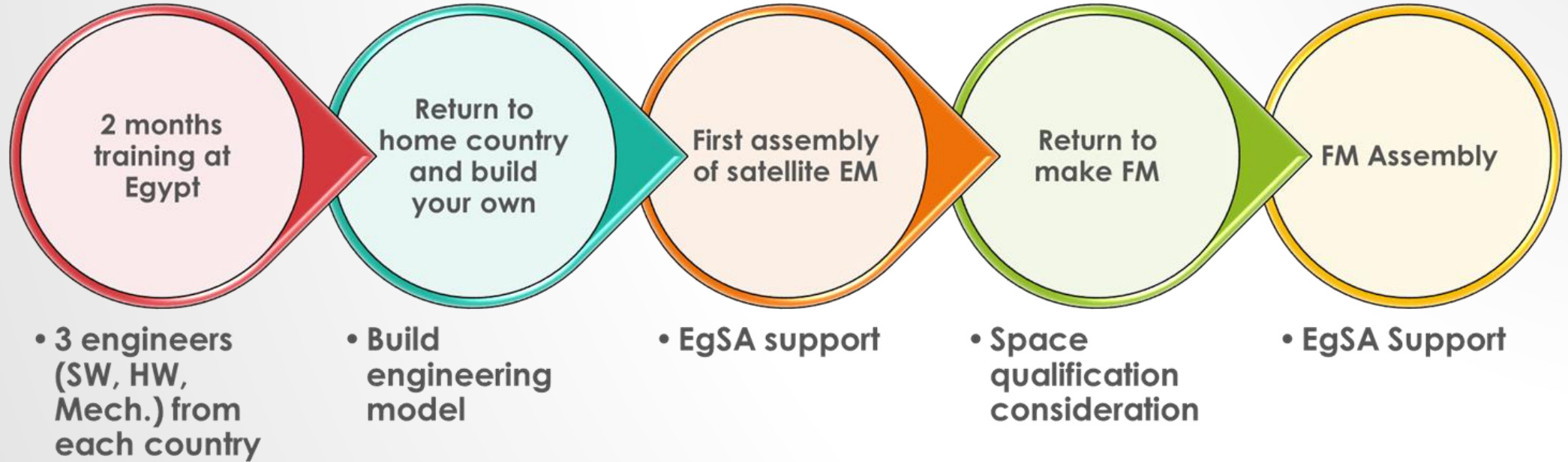
PRELIMINARY MISSION SPECIFICATIONS

- Nanosatellite scale,
- IR camera at Co₂ & CH₄ absorption zone. 1.5 μm - central
- Hypersepctral camera. 0.9-2.01 μm .
- Sun synchronous orbit 650 Km.

-

METHODOLOGY







TRAINING IN EGYPT - August 2021

- The **Hands on** training was held at the premises of the Egyptian space agency- EgSA, from 25 July to 5 August 2021.
- Engineers from Sudan, Ghana, Nigeria, Kenya and Uganda; in addition to the AUC representative.



African Development Satellite

Egypt 2021

Ghana-Kenya-Nigeria- Sudan- Uganda





next step

Steering Committee is formulated from Head of the participating Agencies

Technical committee is formulated from representative from each agency

First working meeting will be carried out in November 2021 to discuss the mission definition document and project agreement



Thank you