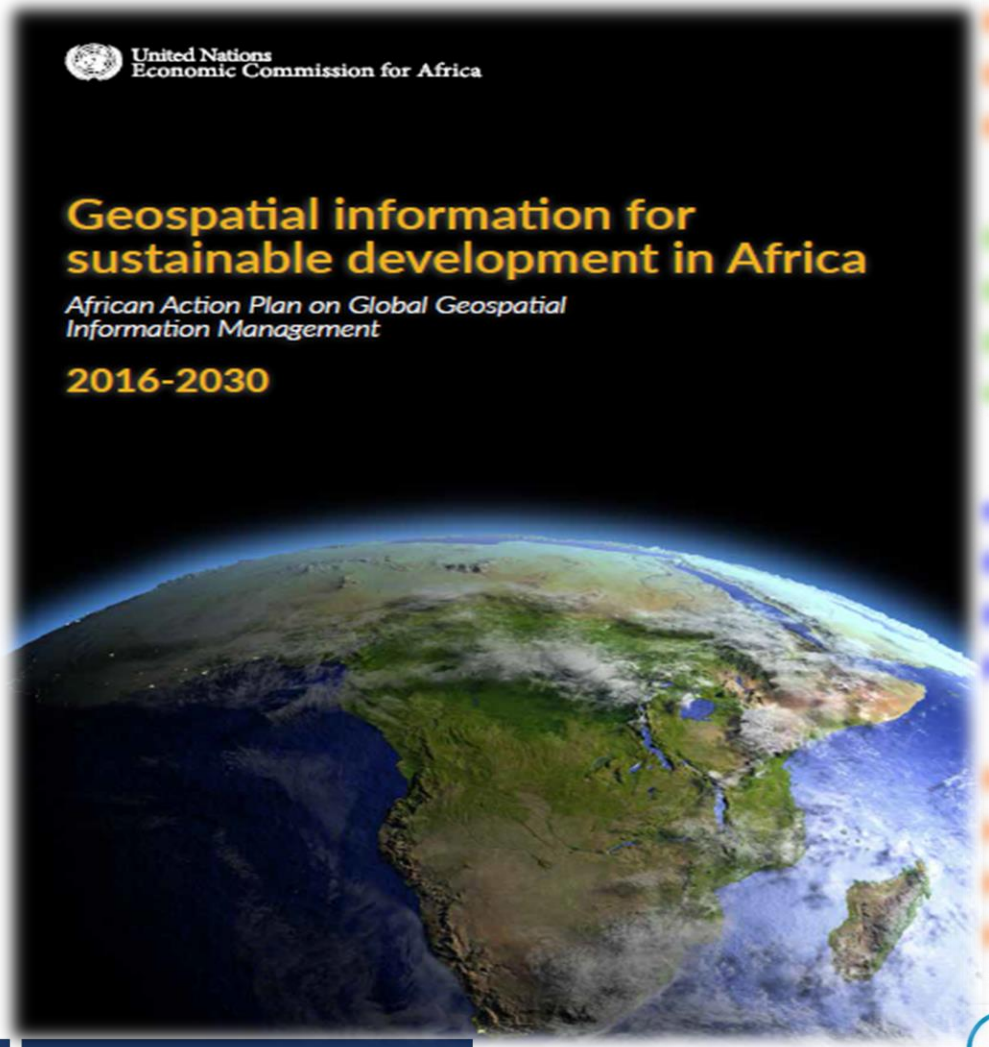
SLC.2020 | REMOTE SENSING BEST PRACTICES 4 SDGS

Holistic Geospatial information Vision for Africa

- Andre Nonguierma
- Chief, GiSS
- Nonguierma@un.org
- United Nations Economic Commission for Africa

- SLC.2020|December 2020



SPACE IN AFRICA | OUTLINES…

Context

- A right decision making requires the gathering and reviewing of up-to-date, cold &hard facts.
- For the facts to be interpreted, understood, and linked to our goals and to our decisions, this needs to bring together data linked with the one thing they have in common: Location (**Where**)

Why we need Geospatial Information

- The Policy Drivers : Global Need for Spatially-Enabled Complex Information
- Everything that happens, happens somewhere over space and time
- 80% of all human decisions involve a "Where?" question
- You cannot count what you cannot locate
- Location affects nearly everything we do in life.

African Holistic Geospatial information Vision

- Coordinated approach for cooperative management of geospatial information that adopts common regional standards, frameworks and tools
- Management of global geospatial information to address key global challenges
- A paradigm shift…. From… geospatial information as standalone data collection… to Knowledge generation, sharing and dissemination
- Organize data so that information (spatially enabled) can be produced as and when needed
- Just in time data on demand
- Produce Once, Use Many Times
- Data collected for one purpose or project can be used for other purposes and projects
- Empower users to do as much as possible by themselves

Geospatial Info. Nexus Issues

- **Availability**

Finding the appropriate information at the required time and at the relevant scale of aggregation.

- **Accessibility**

Even where information is available, it may not be easily accessible, either because of the lack of technology or because of associated costs

- **Transformability**

There is a general lack of infrastructure capacities for the collection and assessment of data, for their transformation into useful information and for their dissemination.

- **Governance**

There is a need for improved coordination among scattered data information, applications & services ecosystems in environment, demographic, social.

Key Pillars

- SDI : Frameworks with related policies & structures
- FDS : Fundamental Geospatial Datasets
- AFREF : African Geodetic Reference Frame
- SALB : Second Administrative Level Boundaries
- GeoNyms: Geographic Names
- Geo-Stats : Locate & Count

Way Forward

Policy : Institutional mechanisms aligned with national efforts, while taking into account international perspectives

Strengthening governance of geospatial information

Data democracy : Ubiquitous availability of relevant spatial data/information as common goods. Adhering to agreed standards : metadata, data models, encoding, interoperability

Meeting urgent development needs

People : High Level Education to empower African youth in geospatial science and technology culture at all education levels (schools, universities)

Providing a service (Spatial enablement)

SPACE IN AFRICA | POLICY DRIVERS

Global Need for Spatially-Enabled Complex Information

Countries have expressed a need for better access and capacity for applying geospatial information to national priorities, in relation to national development objectives and the SDGs.

All the required information for regional priorities and agendas would not be complete without the location. They need to be localized.

They all need to answer "**where**" questions from a regional perspective

Society's Needs	Policy Framework	Required Complex Informations
Food Security	CAADP Land Policy	Rainfall, Yield, production, Crops Distribution..
Water Resources	Africa Water Vision 2020	Hydrography, topography, aquifers, waterbodies
Environment	NEPAD - EPF	Ecosystems, biodiversity, Vegetation, Land cover
Climate Change	Clim.Dev	Rainfall, temperature, wind, aerosols…
Security and Emergency	Africa Regional Strategy on Disaster	Vulnerability, Risk
Health Planning	Africa Health Strategy	Disease

SPACE IN AFRICA | SDGS DATA NEXUS ISSUES

1. WHICH TYPE OF DATA TO PRODUCE | 2. WHAT NEEDS TO RESPOND TO

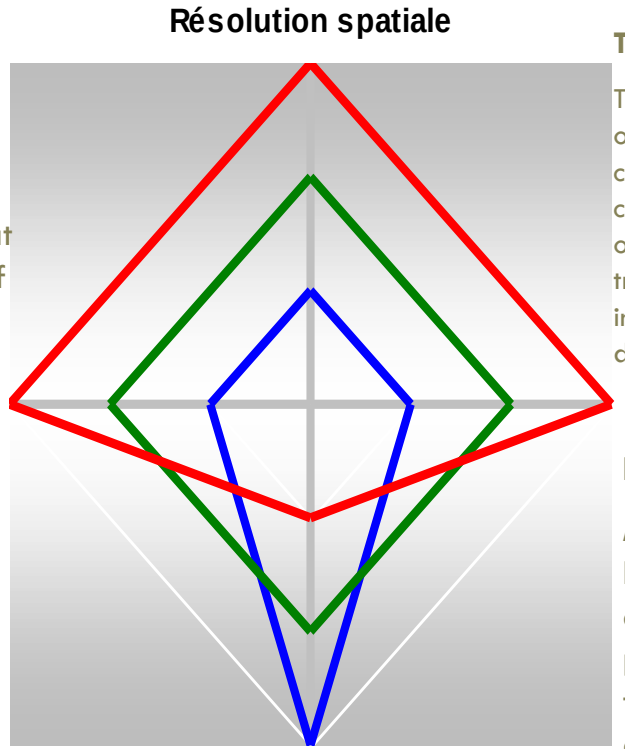
User	Negociator	Decision Maker	Producer
Information	Qualitative	Quantitative	Logistique
Objective	Strategic	Economic	Action
Nature	Indicative (What)	Estimative (Where)	Mesurable (How)
Timeframe	(Multi) Yearly	Seasonal	Daily
Area	Regional	National	Local
Accuracy	Poor	Average	High
Usefulness	Negociation	Discussion	Intervention

Availability

Finding the appropriate information at the required time and at the relevant scale of aggregation

Accessibility

Even where information is available, it may not be easily accessible, either because of the lack of tehnology for effective access or because of associated costs



Transformability

There is a general lack of infrastructure capacities for the collection and assessment of water data, for their transformation into useful information and for their dissemination

Dssemination

Même lorsque l'information est disponible, elle peut ne pas être facilement accessibles, pour diverses raisons

SPACE IN AFRICA | HOLISTIC VISION | COORDINATED APPROACH

- Coordinated process that adopts common regional standards, frameworks and tools
- Addressing key global challenges including Sustainable development, climate change, disaster management, peace and security, and environmental stresses

SPACE IN AFRICA | OPPORTUNITIES

Political Support

Political Buy-in
More and more political awareness and engagement

Indigenous Capabilities

New Business Model
African Initiatives and Centres of Excellence (Stellenbosch, Regional Centres, National EOS…)

Constructive Partnership

Enhanced and expanded International Cooperation with emphasis on South-South Cooperation involving Africans, diasporas and partners

National Efforts

National Programmes
More and more African Initiatives and Centres of Excellence

Taking advantages of

- Space policies in Africa
- Institutional coordination and arrangements
- Synergistic approaches
- Guiding principles on data, applications and services

Continent Space Governance

Synergism
Constructive partnership

Enabling Operational Environments

Multi-level long term
Infrastructures and Networking
Indigenous Space Capabilities

People Needs

Accessibility of evidence-based information.
Connectivity and data exchange between producers and users
Information, Products & Services Linking global to local

High-Level Education and Holistic Capacity

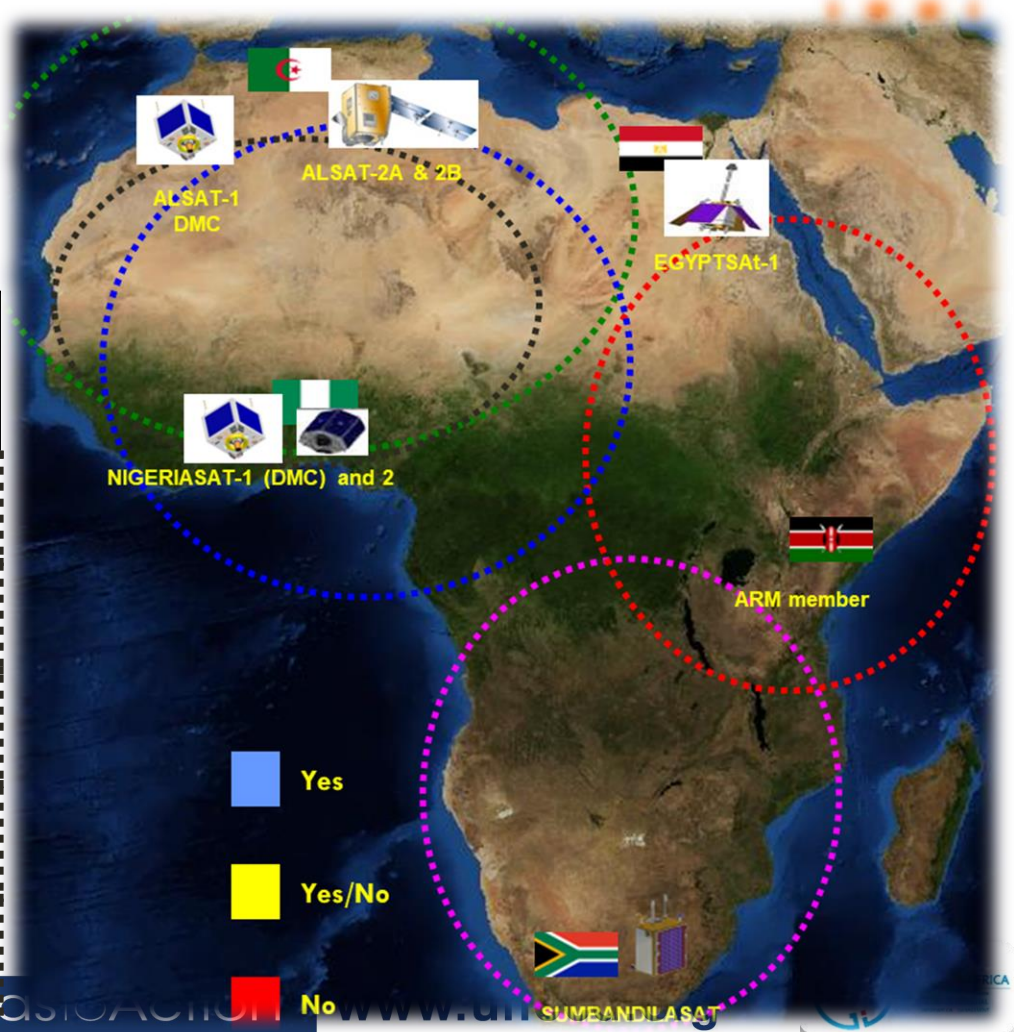
Education is essential : Leads to technology adoption, ingestion and use
Basic training : To maintain operational capacity in space applications for technicians, managers, scientists and basic users
High Level Training : Empower African youth in space science and technology culture.
Core African space scientists (pure and applied research)

SPACE IN AFRICA | ENABLING INFRASTRUCTURES

Existence of Operational Centres of Excellence

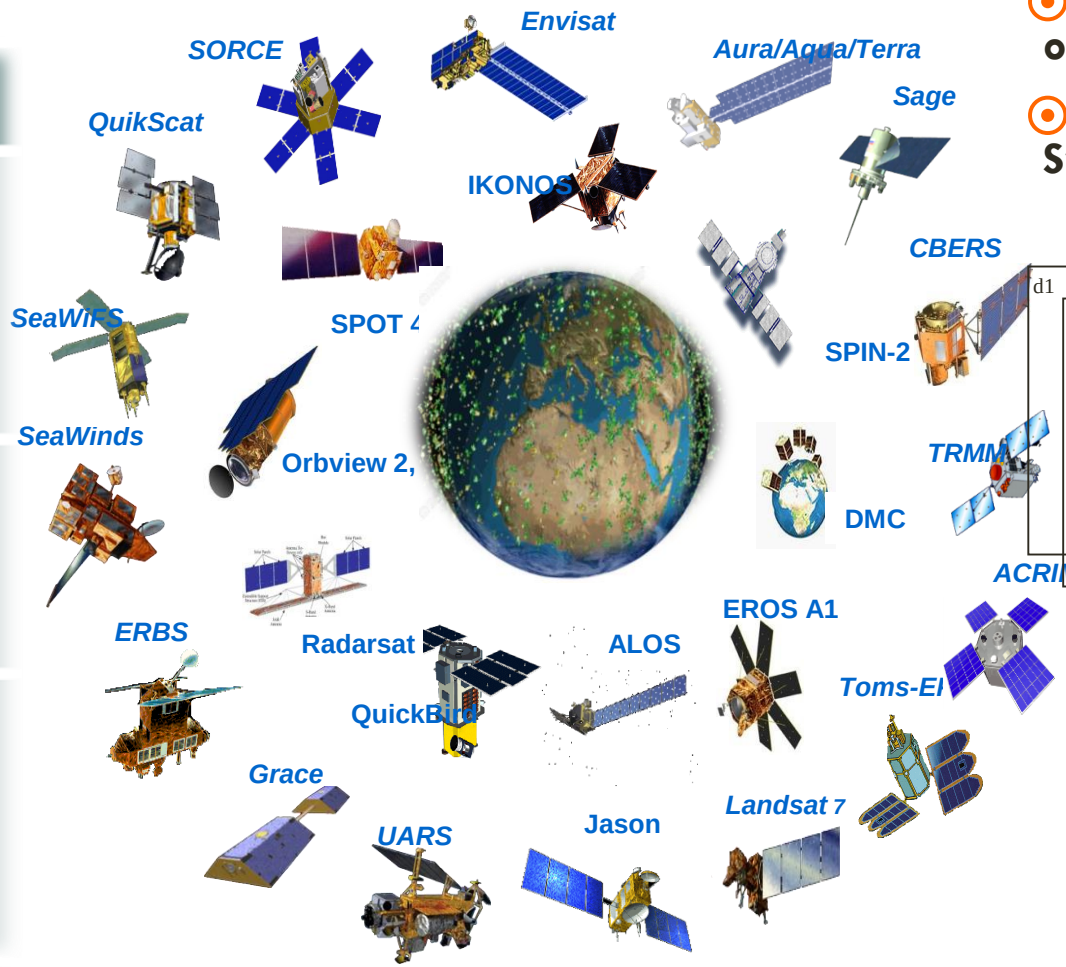
- AGRHYMET – RECTAS – RCMRD - RSAU - CRASTE
- African countries developing and acquiring EOS |Algeria, Egypt, Ethiopia, Ghana, Kenya, Morocco, Nigeria, South Africa…

	Data collection, accessibility and integration			Monitoring and Assessment			Inform. Diffusion & Capacity	
Institutions	Collect	Access	Integration	Assessment	Monitoring	Forecast	Diffusion	Capacity
AGRHYMET								
RCMRD								
CRTEAN								
RSAU								

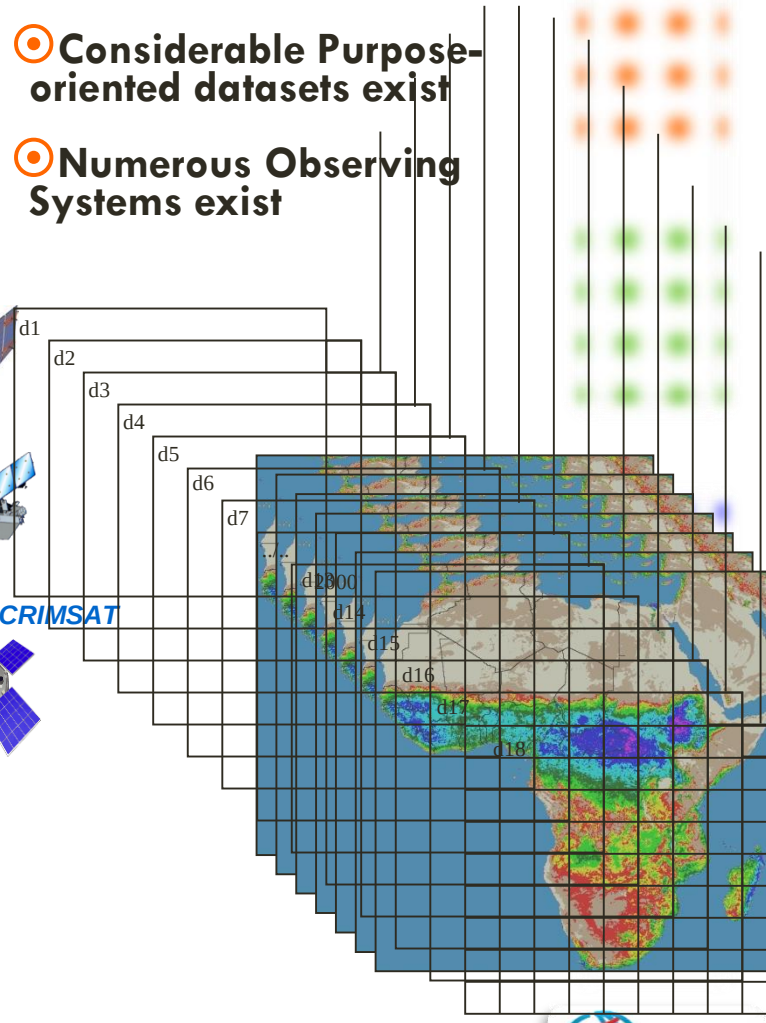


SPACE IN AFRICA | DATA & PRODUCTS

Categories	Types	Operational Examples
Raw Data	• Satellite image • Aerial Photos • Radar	• MSG • LANDSAT • QuickBird • RADAR • Nations EO
Processed Data	• Indexes • • Time Series	• GeonetCast • RFE • Lands
Analysed Data	• Quantity • Trends • Forecasts	• GMFS • SAF • Global Changes



- Considerable Purpose-oriented datasets exist
- Numerous Observing Systems exist



SPACE IN AFRICA | OPERATIONAL SERVICES

- Maturity in Developing Core Operational Services
- GMES & Africa Programme

Domains	Products / Services	Tools / instruments	Operational Programmes
Water	▪ Wetlands ▪ Surface Water ▪ Ground Water ▪ Flooding	MSG, LANDSAT, SPOT-XS	TIGER AMESD AQUIDEV
Climate	▪ Rainfall ▪ Temperature ▪ ETP	MSG, NOAA	AGRHYMET ACMAD AMESD ZAR
Vegetation	▪ Forest cover ▪ Density ▪ Biomass	MSG, NOAA, SPOT-VGT, MODIS, LANDSAT ENVISAT, RADAR, CBERS, IRS	PSRN GEOLAND AMESD ACP/Obs
Lands	▪ Land Cover ▪ Soils Types	SPOT-XS, LANDSAT ENVISAT, RADAR	Africover LADA AMESD GlobCover
Topography	▪ MNT ▪ Slopes ▪Exposition	ENVISAT, RADAR, SPOT, TOPEX,	AFREF EGNOS
Security	▪Disasters	MSG ARMC	UNSPIDER WFS

Agriculture
To develop a sustainable & social agriculture

tal & Marine
preservation and development of tivities

Crédit UNEP

Health
Emerging and Endemic

Natural Resources Management
Preservation of environmental assets

Risk managem
To mitigate impac
hazards hit

SPACE IN AFRICA | GMES & AFRICA

Courtesy | Meshack {2020)

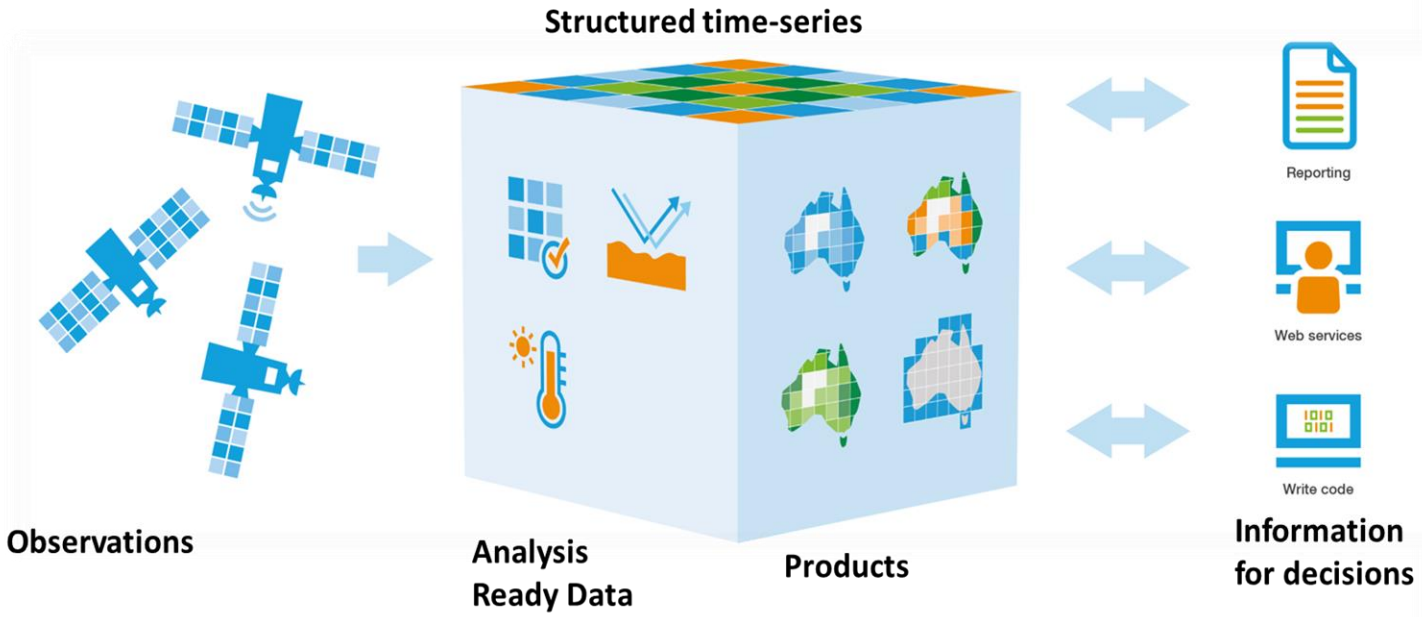
Raw Data
- Satellite Imagery
- Biophysics
- Socio-Economic

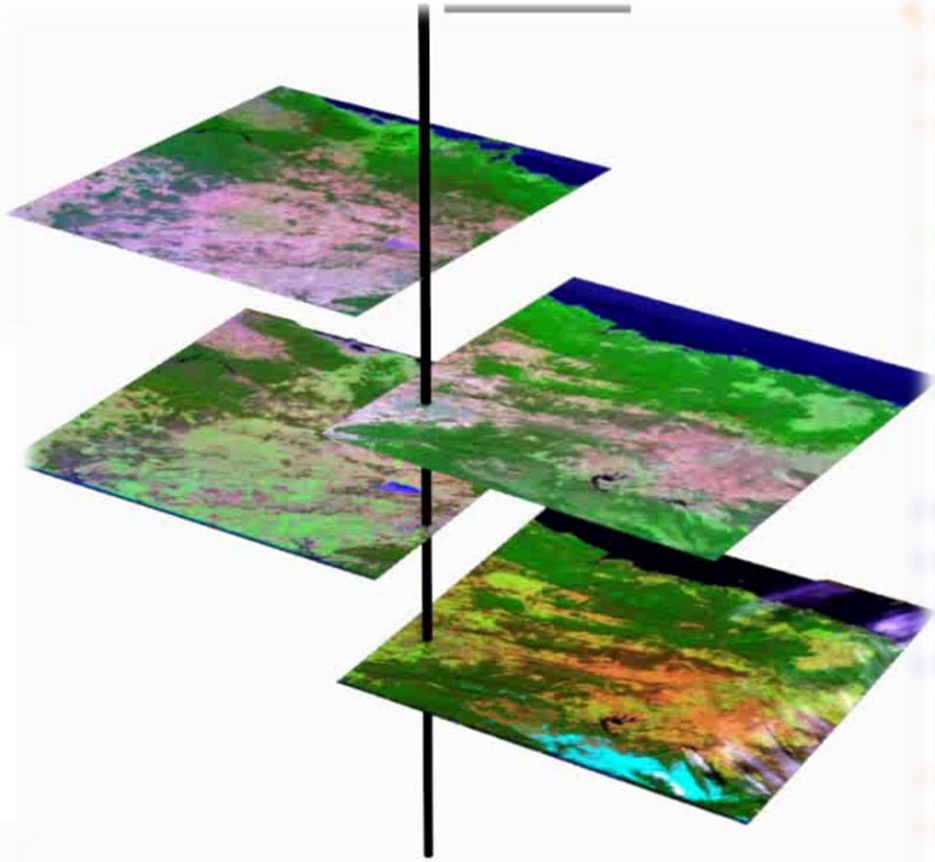
Processed Data
- Land Cover
- DEM

Analyzed Data
- Dynamics & Seasonalities
- Trends

SPACE IN AFRICA | DIGITAL EARTH AFRICA

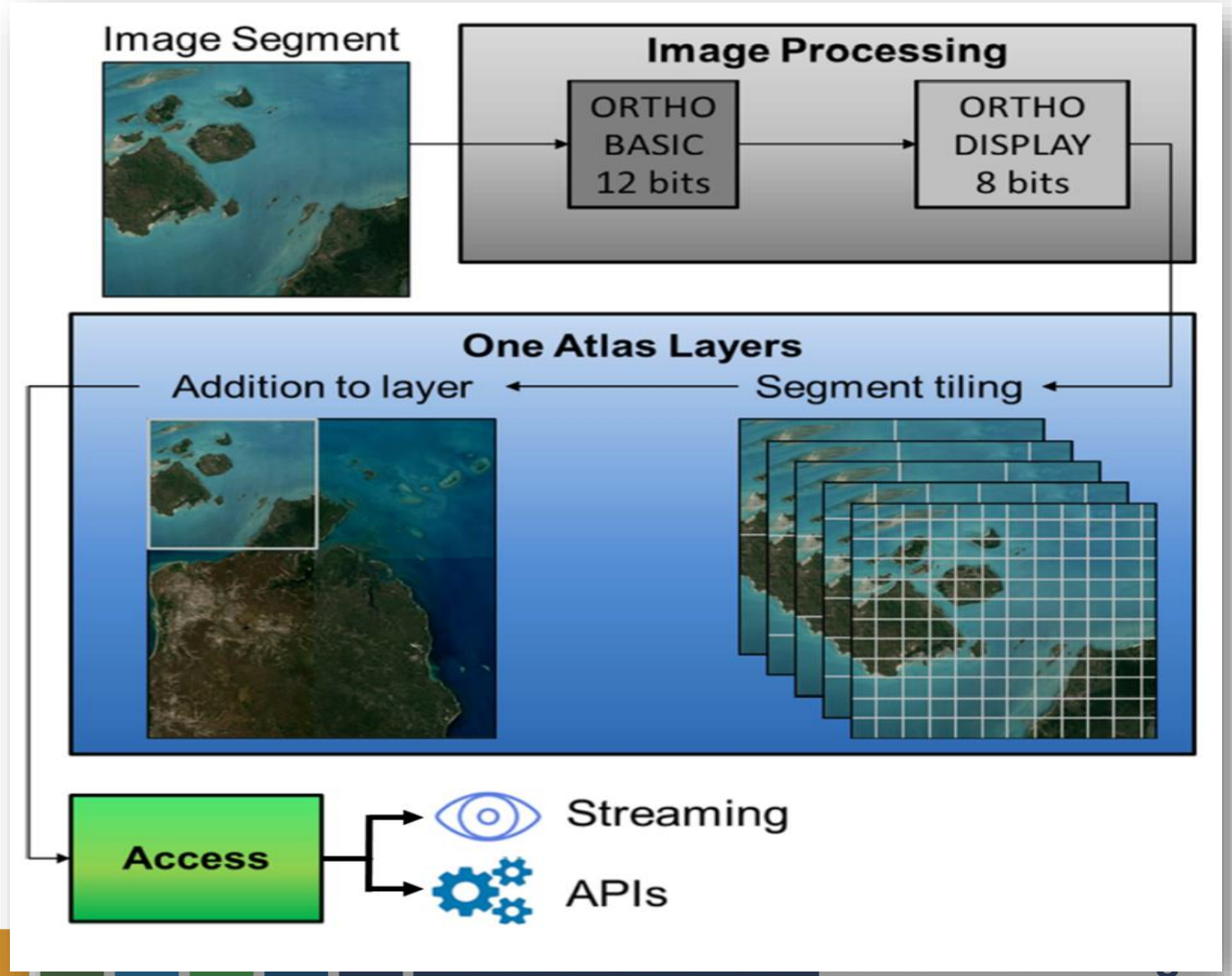
Digital Earth AFRICA





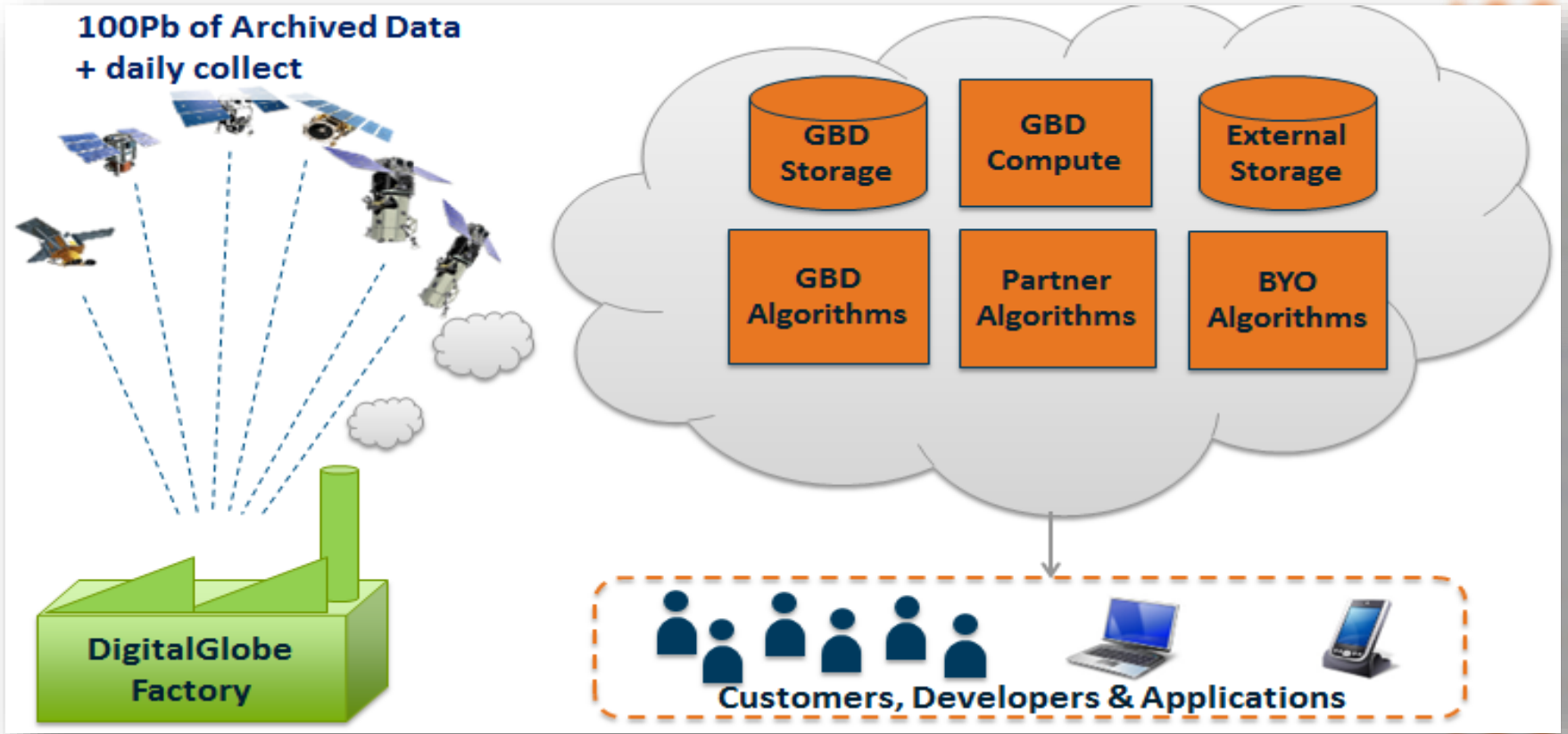
SPACE IN AFRICA | ONE ATLAS FOR AFRICA

- A streaming service delivering access to Airbus satellite imagery over the whole Africa
- Fully refreshed within a 12-month period.
- Data enriched by a Digital Elevation Model layer.
- GIS-ready, Ortho-rectified imagery



SPACE IN AFRICA | DIGITALGLOBLE EARTHWATCH

- A revolutionary cloud based imagery solutions for Stats and SDG in Africa
- With highest accuracy and quality images available online.
- Hosts most timely satellite imagery of world events.
- Provide image access within hours of acquisition.
- View and downloading privileges to any area of Interest (AOI).
- Designed in such a way you pay on what you use.
- The model enables users to get best value by only paying for what he needs.
- The licensing models vary depending on the demand.

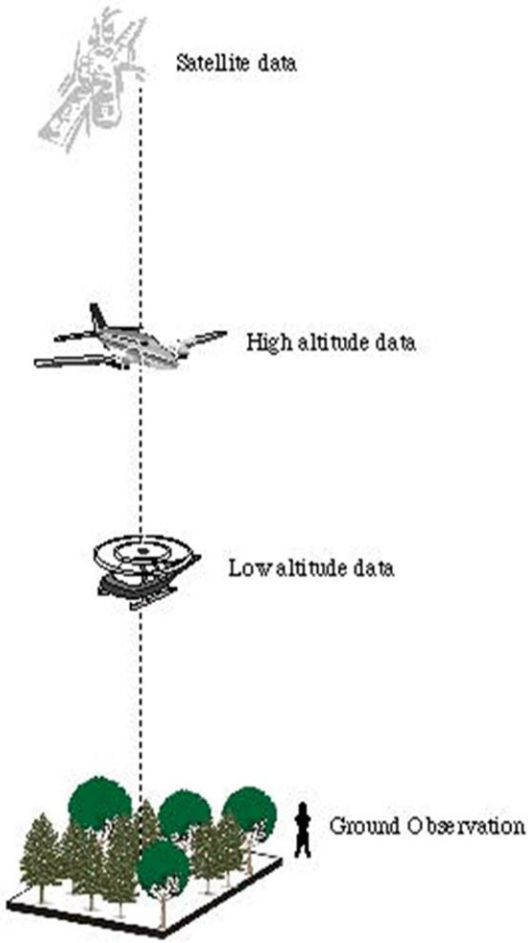


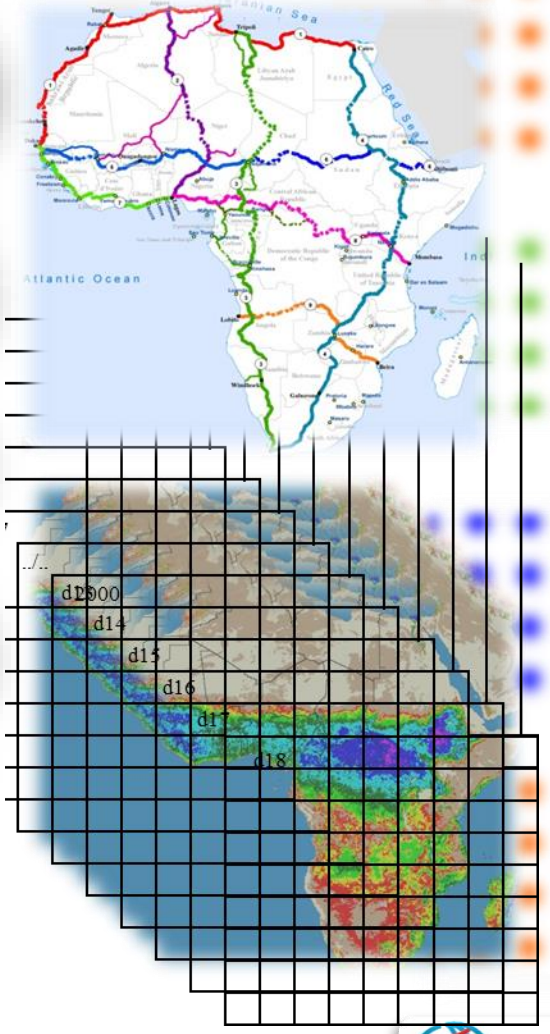
100PB + 1 billion km^2 of fresh imagery per year

SPACE IN AFRICA | BUILDING FUNDAMENTAL DATA THEMES

Space Technology can advance Africa efforts to build :

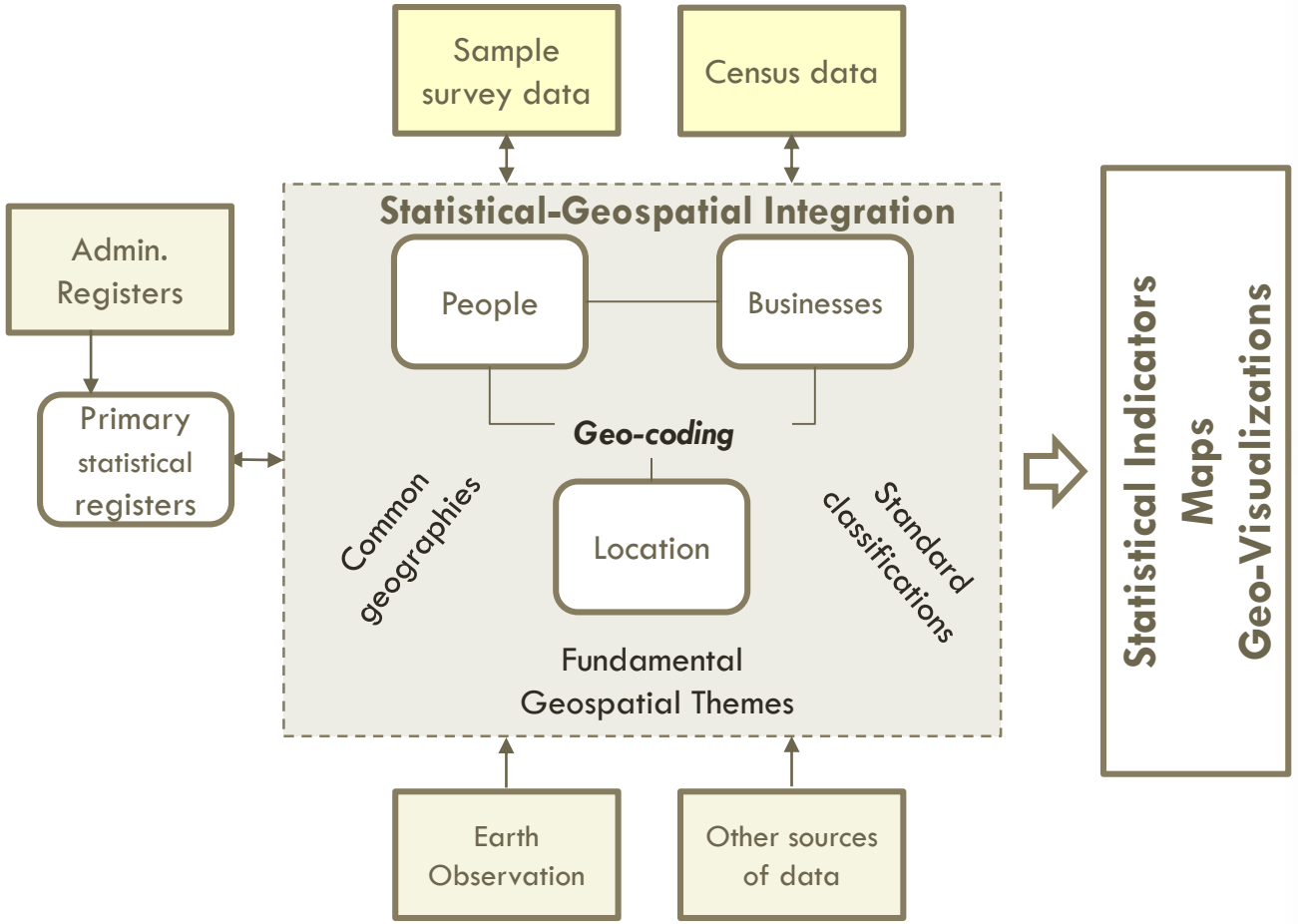
- Purpose-oriented datasets
- Structured and comprehensive data foundation that would be consistent, comparable and compatible at the local, national, regional, and global levels.



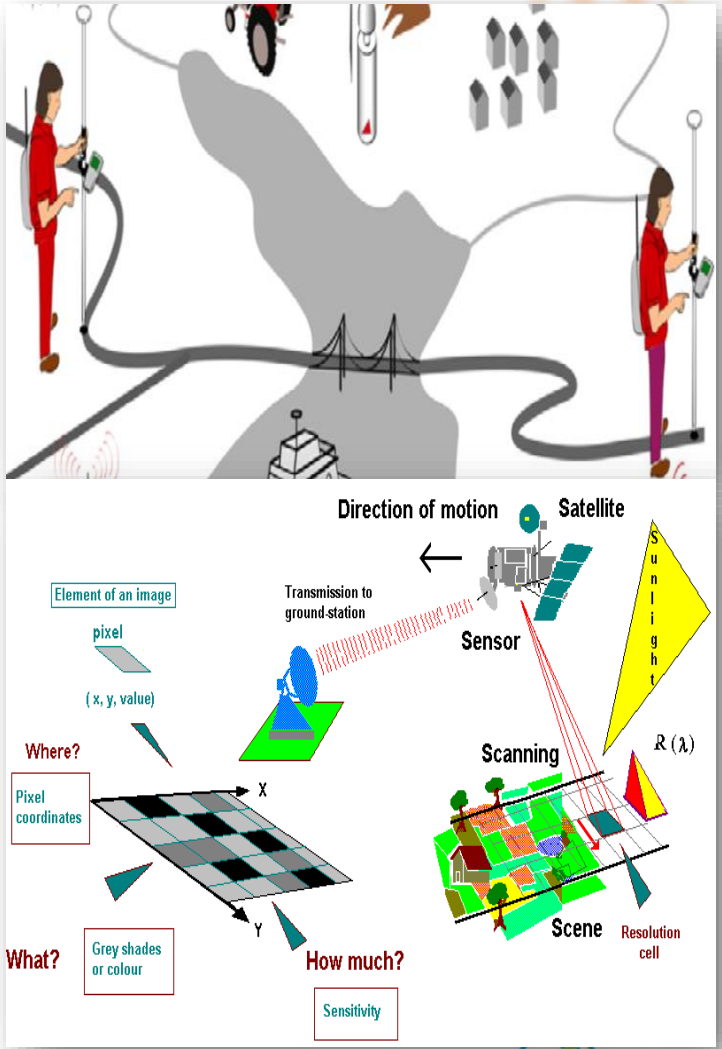


SPACE IN AFRICA | RESPONDING TO THE SDGS

- **Common Geographies**
  - Updating and sharing common administrative boundaries
- **Responding to the SDG**
  - Building, Holistic, Active, All-inclusive Information
  - Enriching statistical data
- **2020 Round of Censuses**
  - Fostering geospatially-enabled censuses.
  - Building geo-referenced dwelling frames



Adapted from G. Luis Morales 2018



SPACE IN AFRICA | DATA SHARING VS SPACE LAW

1. Structural [Frameworks]

- Law | Regulations
  Aappropriate data policies
- The law is reason. Ensure that data access arrangements observe the highest policy and ethical frameworks

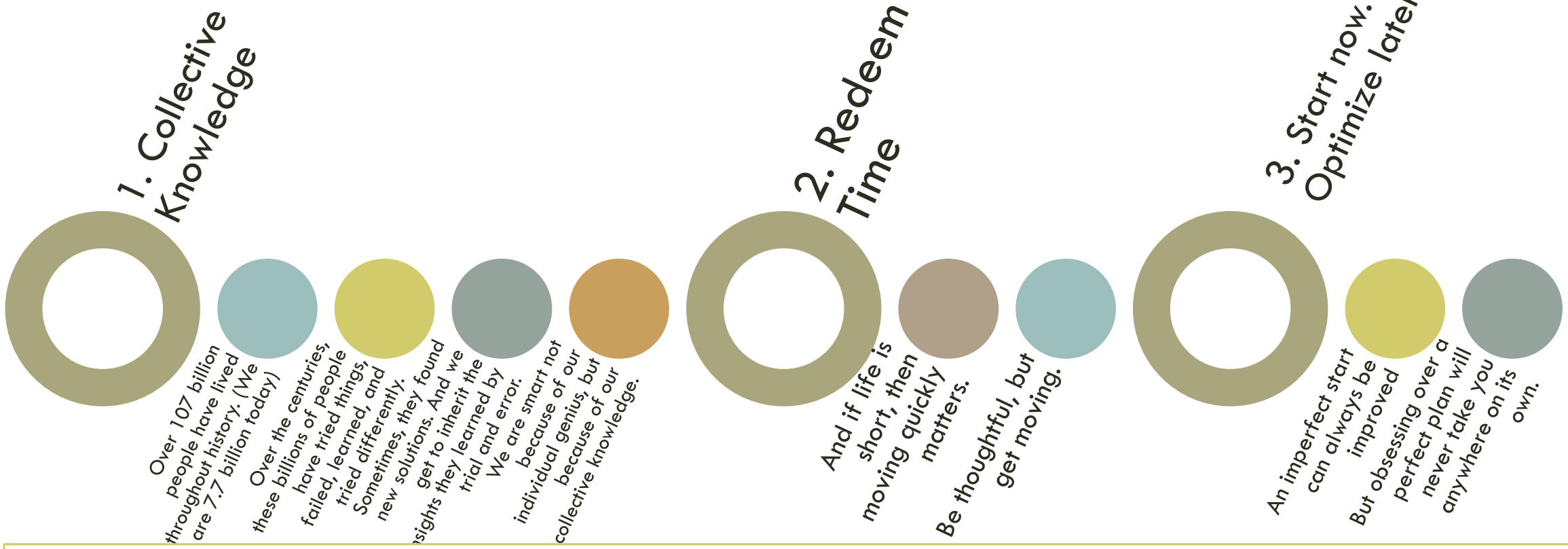
2. Management [Governance]

- Appropriate technical infrastructure
  Appropriate common tools and standards
- Ensure data are fit-for purpose
  Develop once, Use many times

3. Collaboration [Partnership]

- Cooperative management of data
  Collective approach in addressing information needs
- Explore collaborative solutions in preference to developing national space programmes

SPACE IN AFRICA | TRYING TO SAY IT…



1. Africa is increasingly acquiring capacity to produce, process and use Earth Observation data for sustainable development agenda
2. The World is increasingly developing satellites that are relevant to the African context and mechanisms for timely access (availability, affordability, infrastructure) to the data (historical, current and future).
3. Africa is slowly developing / updating capacity in the engineering and application of space science and technology and the requisite infrastructural capabilities

REFERENCE

The African Action Plan :

English:
www.uneca.org/sites/default/files/PublicationFiles/un-ggim_-_geospatial_information_for_sustainable_development_in_africa-20171115.pdf

French :
www.uneca.org/sites/default/files/PublicationFiles/geospatial_information_for_sustainable_development_in_africa_fre-20171115.pdf