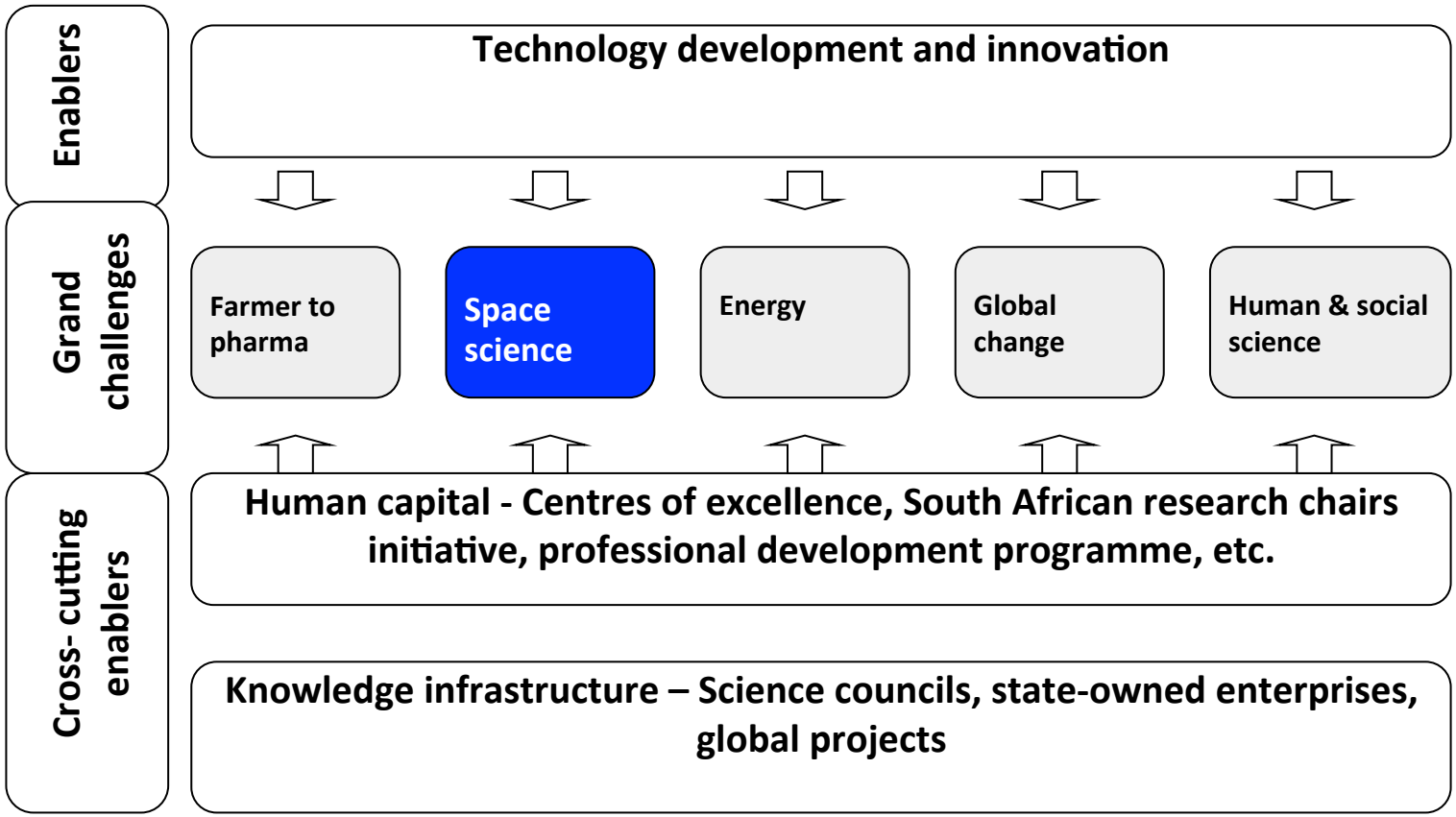
THE NATIONAL SPACE STRATEGY

Space Science and Technology
Department of Science and Technology

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

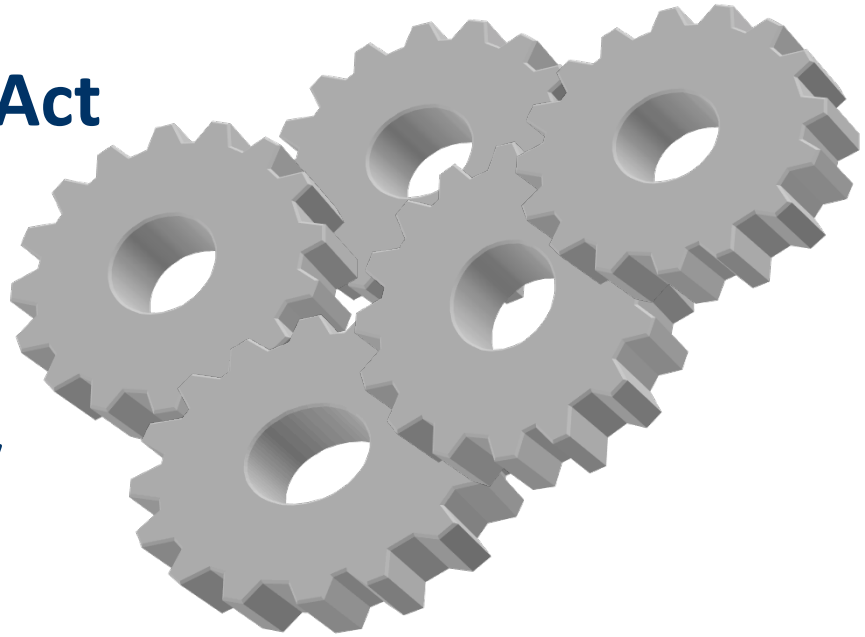
Ten Year Innovation Plan



National Instruments

South African Earth Observation Strategy

Space Affairs Act



National Space Strategy

National Space Policy

South African National Space Agency Act

Legislative Mandate

- Space Affairs Act (Act No. 84 of 1993)
  - Section 2: Determination of Policy
    - Meeting all international commitments and responsibilities
    - Controlling and restricting the development, transfer, acquisition and disposal of dual-use technologies
  - Section 3: Compliance with Policy
    - Ministers to exercise powers and perform duties in accordance with the Policy
  - Section 4: Establishment of South Africa Council for Space Affairs (SACSA)

Legislative Mandate

- Space Affairs Act
  - Section 5: Objects and Functions of Council
    - Implementation of the space policy
    - Compliance with international conventions, treaties and agreements
    - Council activities
      - Advise the Minister of **the dti**
      - Hear representations regarding space affairs
      - Implement matters relating to international obligations
      - Issue licences
      - Registration of institutions operating in the space industry
      - Publication of information relating to activities of Council

Legislative Mandate

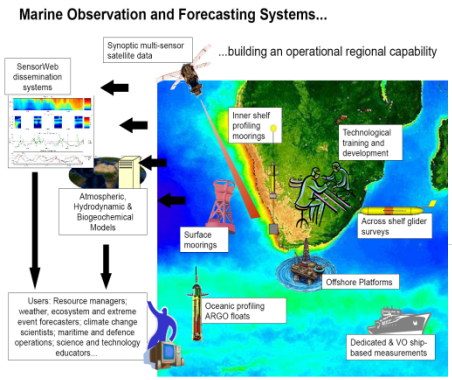
- International Conventions, Treaties and Agreements
  - The Outer Space Treaty (ratified)
  - The Rescue Agreement
  - The Liability Convention (ratified)
  - The Registration Convention (ratified, same)
  - The Moon Agreement
- Member state to the United Nations Committee on the Peaceful Uses of Outer space (UNCOPUOS)

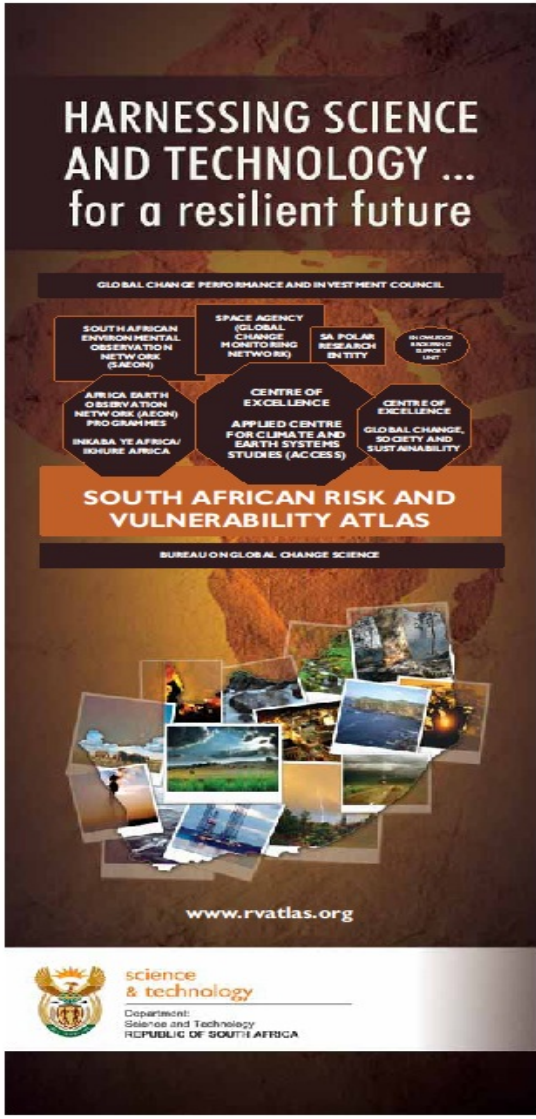
National Space Policy Objectives

Improve coordination in the South African Space Arena
Facilitate the provision of appropriate and adequate space capabilities
Promote capacity building
Foster a robust science and technology base
Promote the development of an appropriate competitive domestic sector
Improve cooperation with other nations
Promote greater awareness and appreciation

Vision

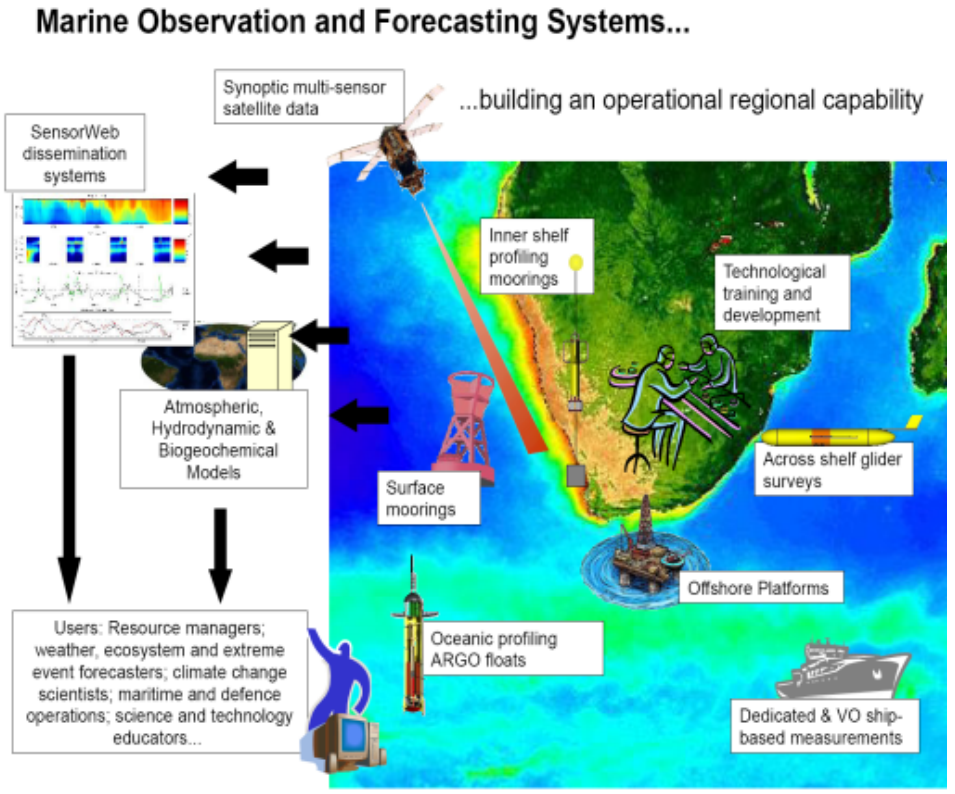
For South Africa to be among the leading nations in the **innovative utilisation** of space science and technology that **enhances economic growth** and **sustainable development** in order to **improve the quality of life** for all





Goals

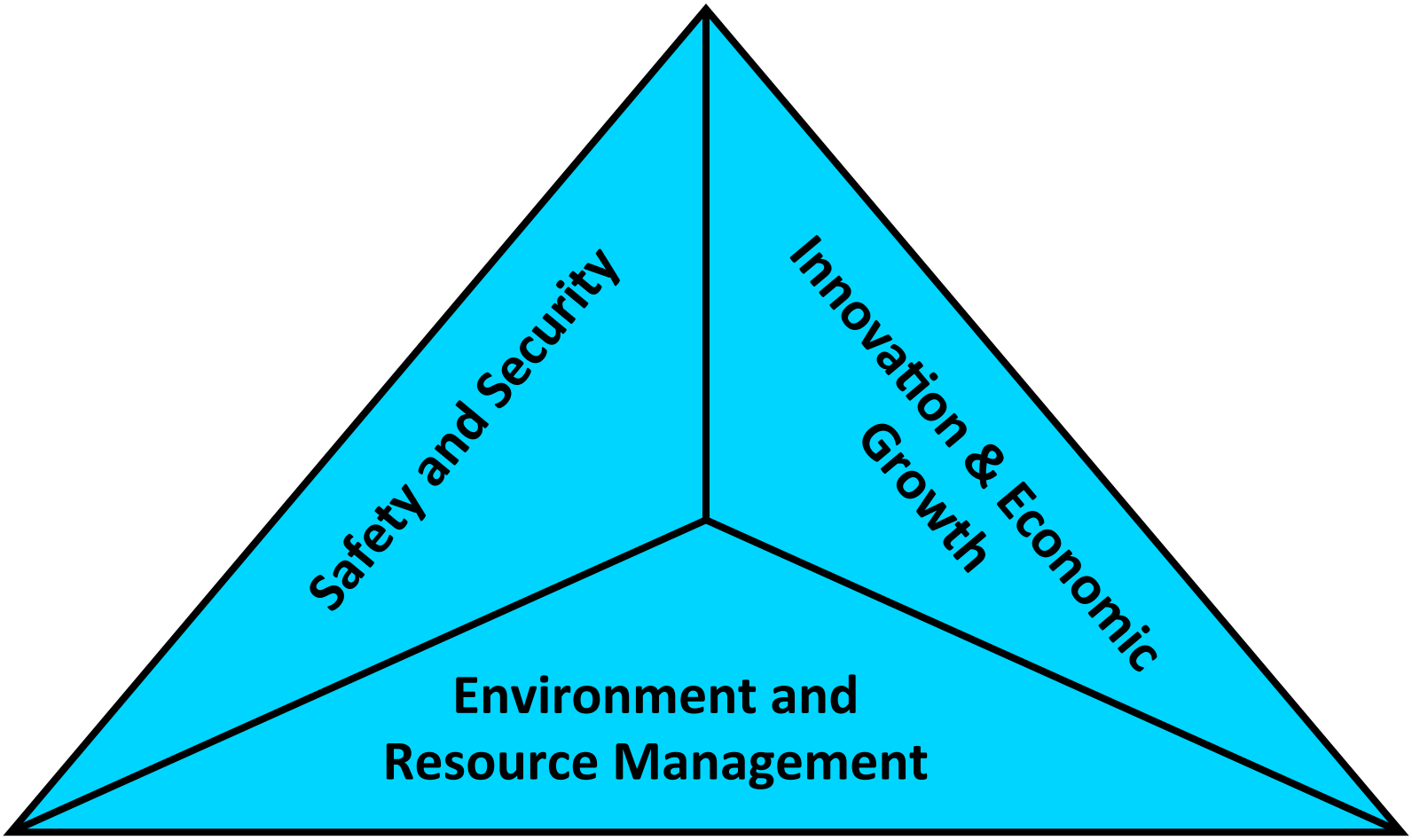
- To empower better decision making through the integration of space-based systems with ground-based systems;
- To use space science and technology to develop applications;
- To capture a global market share for small to medium-sized space systems;



Objectives

Developing the local private space science and technology industry sector	Strengthening training and technology transfer programmes;
Developing services and products that can respond to user needs;	Promoting space science and technology in academic institutions and science centres;
Developing an export market for specific equipment for satellite or services;	Responding to challenges and opportunities in Africa;
Optimising the organisation of future space activities	Advocating the importance of space science and technology; and
Organising some of the current space science and technology activities into strategic programmes;	Building local awareness of space science and technology and its benefits.
Partnerships with established and developing space-faring countries;	

Key Priority Areas



Environment & Resource Management

- Environmental and geospatial monitoring
- Ocean, coastal and marine management
- Land management
- Rural development and urban planning
- Topographic mapping
- Hydrological monitoring
- Climate change mitigation and adaptation
- Meteorological monitoring

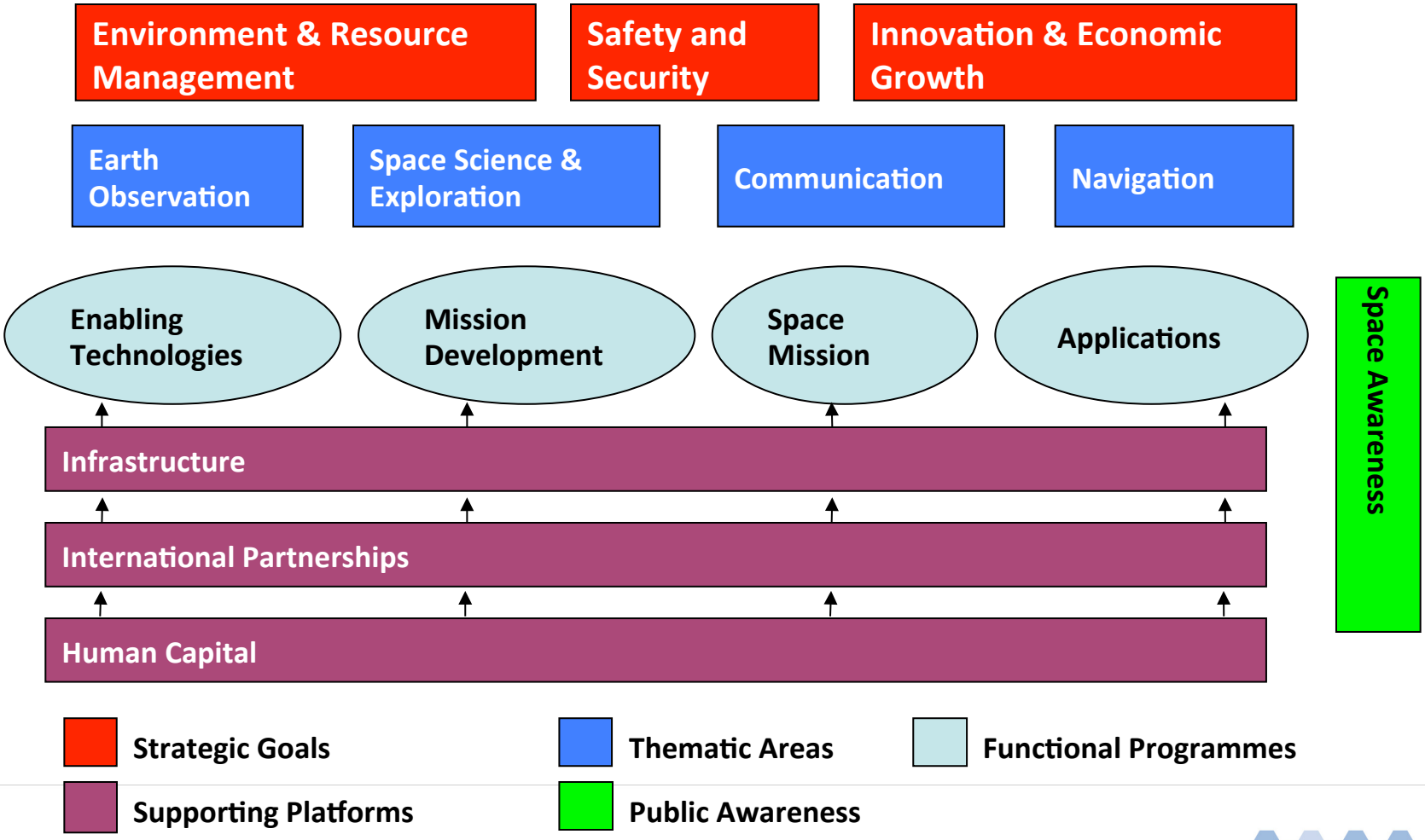
Safety and Security

- Disaster monitoring and relief
- Hazards forecasting and early warning
- Cross border risk
- Disease surveillance and health risk
- Asset monitoring
- Regulatory enforcement
- Defense, peacekeeping and treaty monitoring

Innovation & Economic Growth

- Tourism and recreation
- Communications
- Space science and exploration
- Space technology transfer and spin-offs
- Development of the space industry

National Space Strategy Building Blocks

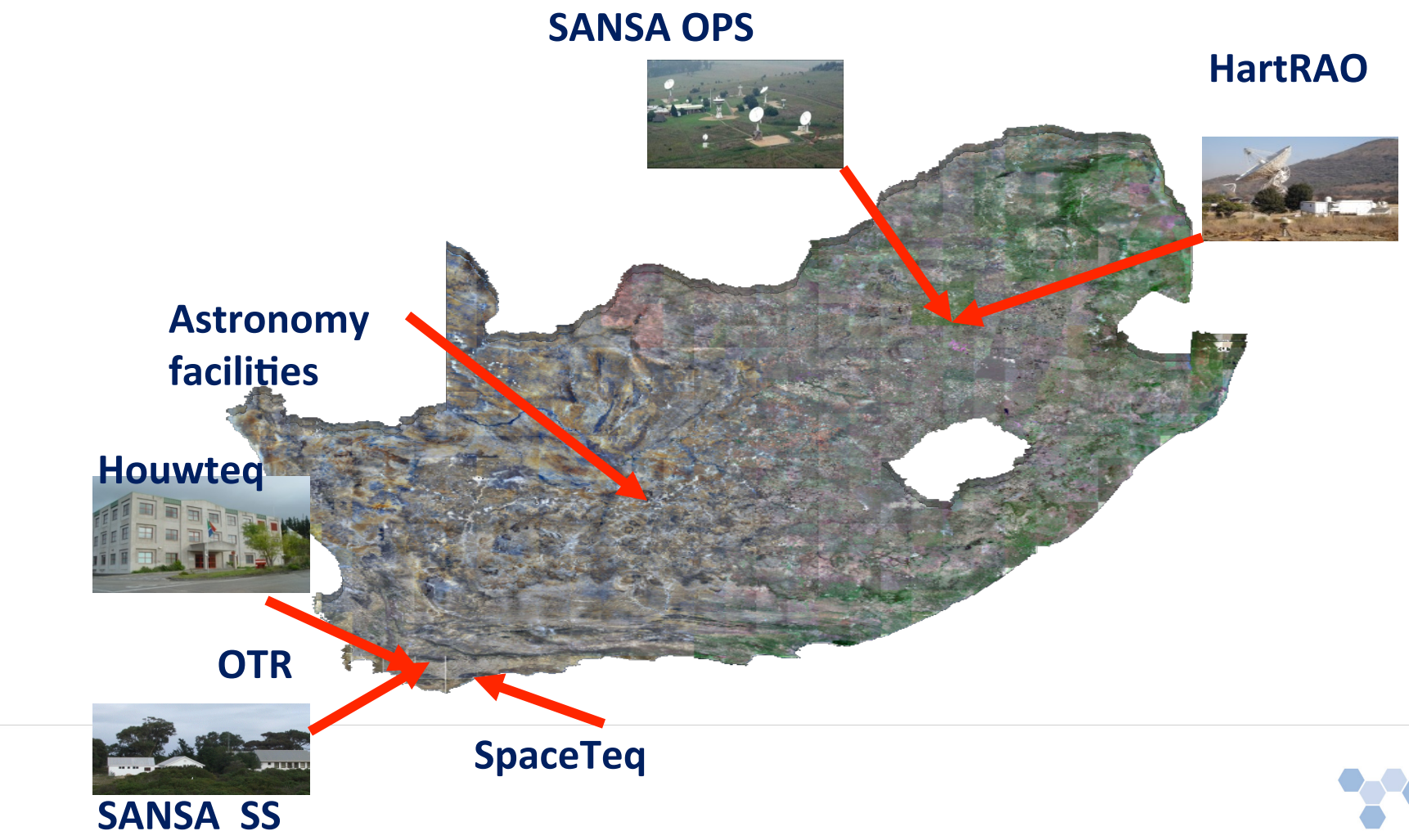


SANSA ESTABLISHMENT AND OPERATIONS

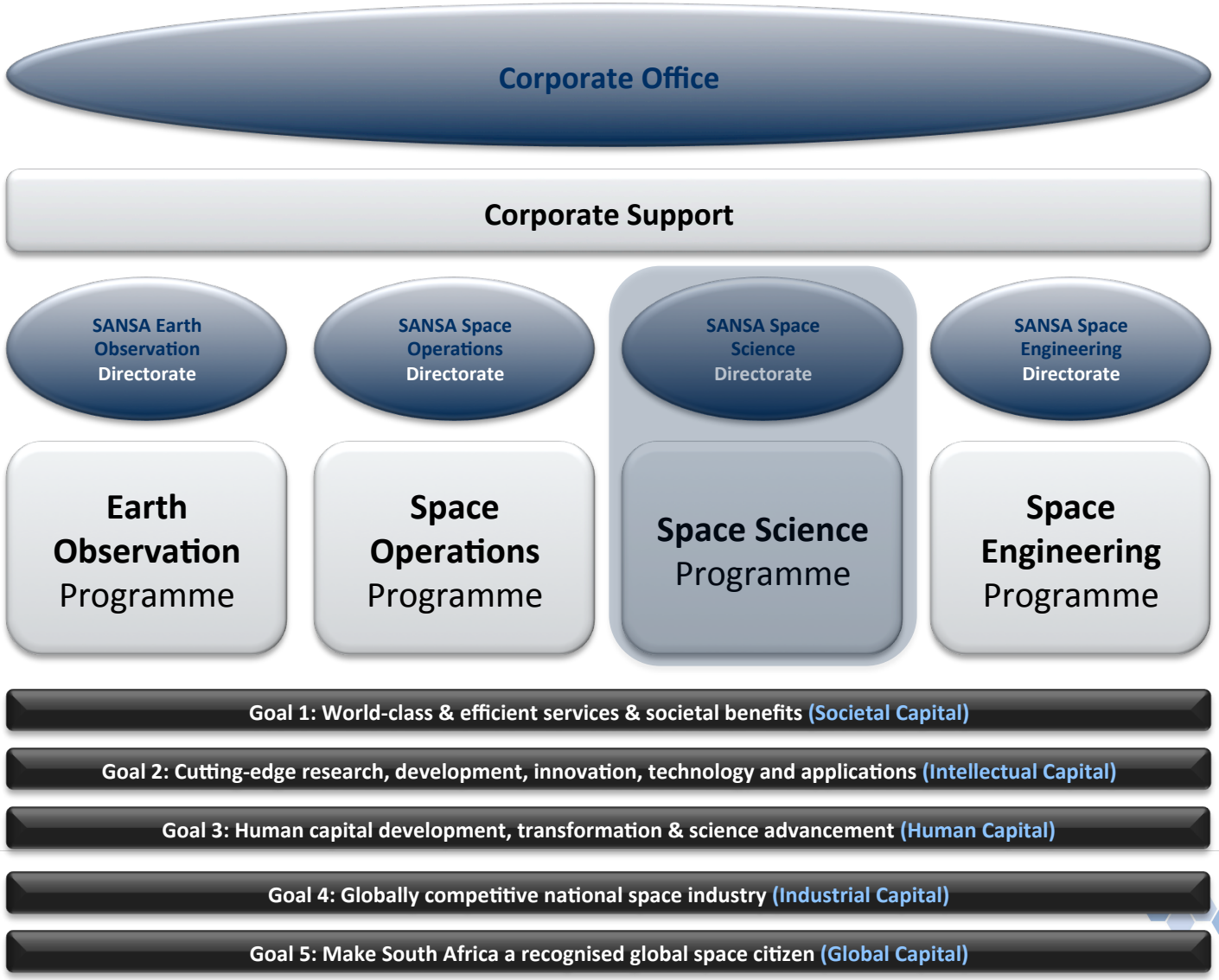
SANSA Establishment

- **SANSA was officially launched in December 2010**
- **Vision:**
  - A lead agency on the continent that coordinates and implements space activities to contribute socio-economic growth and sustainable development
- **Mission:**
  - To deliver an enabling environment through:
    - The development of space technology platforms;
    - The use of space for observational and scientific missions; and
    - The development of space applications

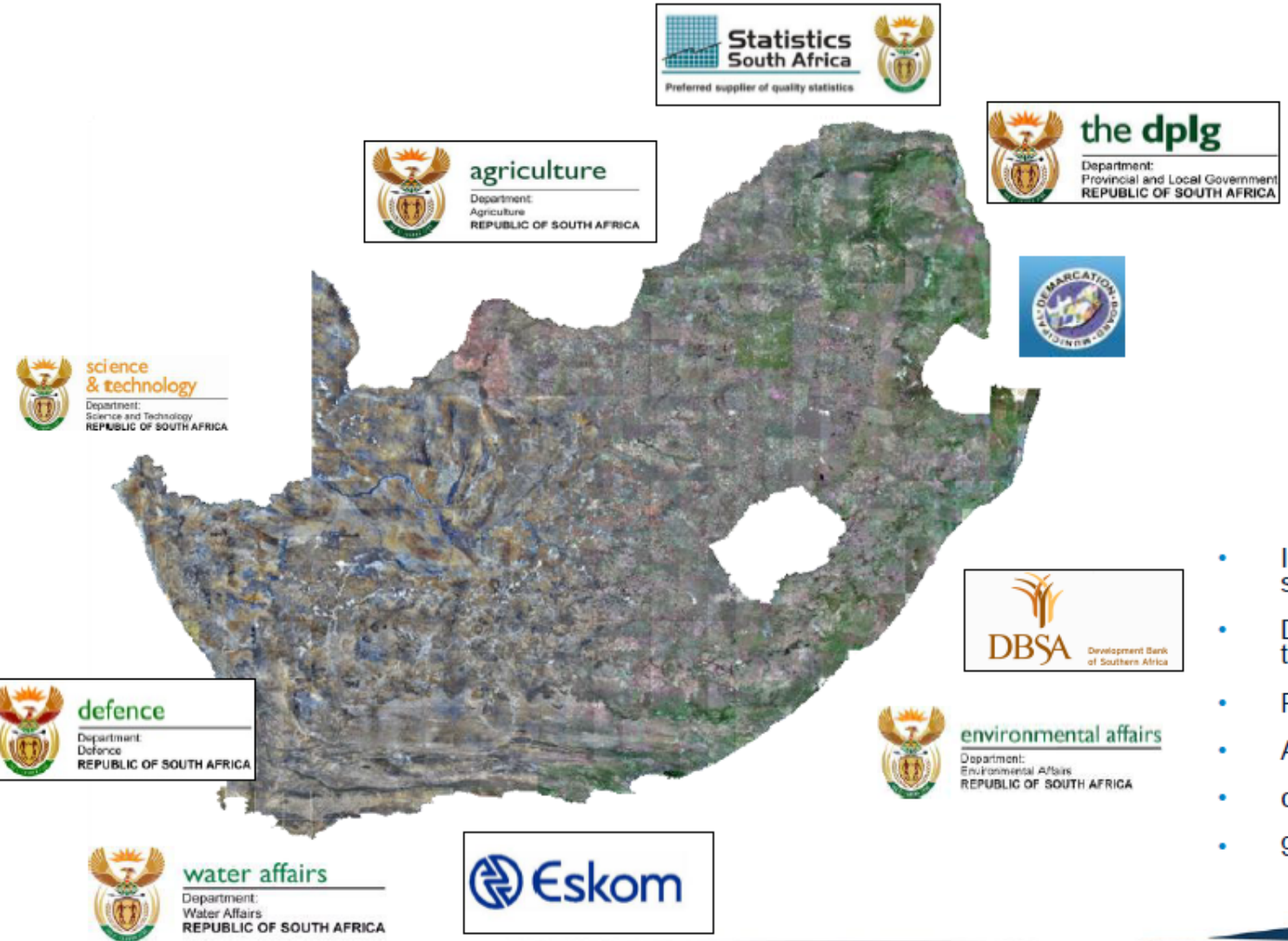
Space facilities



SANSA Structure



Example: Over 66 Government Departments & entities (national provincial and local government) now dependant on spot 2.5m res mosaic



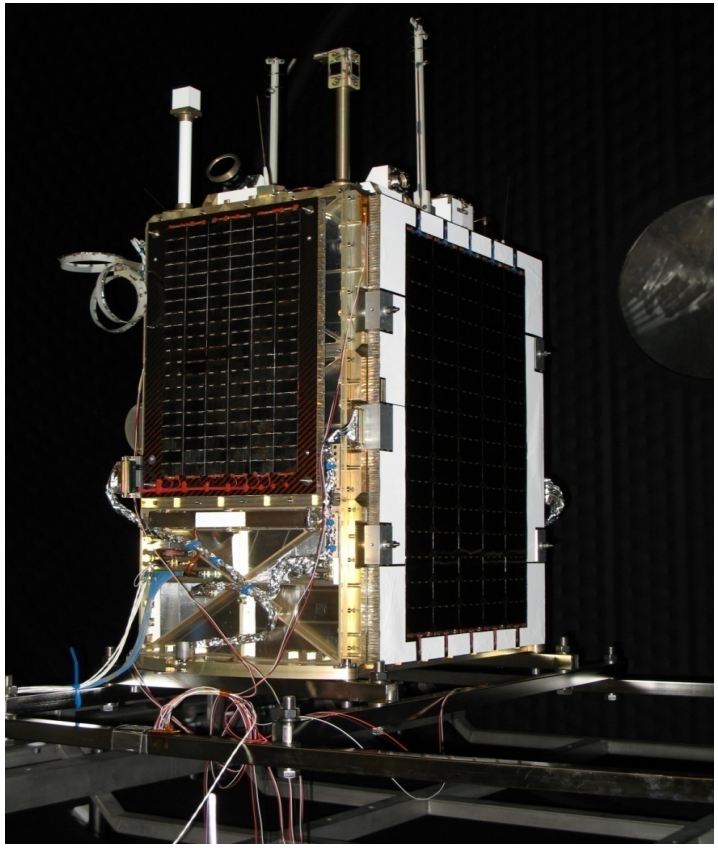
- Images taken for Mosaic 952 scenes
- Delivery 24 February 2012 for the 6th consecutive year
- Processing time 8 months
- Acquisition time 12 months
- cloud cover less than 5%
- 90% nadir scenes

MISSION DEVELOPMENT

SumbandilaSat

Launched on 17 September 2009, Baikonur

- SumbandilaSat success stories:
  - HCD (8 interns,17 Masters; 1 PhD,)
  - Innovation and knowledge generation (Attitude Determination and Control System, mission control and operation capabilities),
  - Significant outreach and awareness activities across the country
  - +12 000 global scenes acquired and used for flood and fire mapping



- **Mission Development**
  - ✓ African Resource and Monitoring Constellation
    - Secured funding for ZA-ARMC 1
    - Mission design
  - ✓ IBSA Satellite
  - ✓ Cube Satellite

Technology innovation and applications

- *Africa Space Innovation Centre* serves as Innovation Hub
- Early production phase
- Products distributed through ClydeSpace, Scotland

CubeSat S-Band Transmitter

Part number: CS-CPUT-STX-01
Cost: £10,000.00

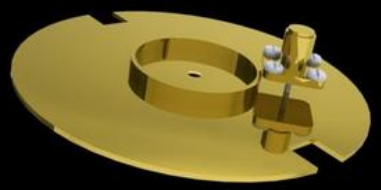
The STX is a compact S-Band Transmitter designed for CubeSat missions. It is compatible with the CubeSat standard, with a CubeSat Kit PC104 form factor. The STX implements QPSK modulation with transmission data rates of up to 2 Mbps.

The STX is ideal for space missions where a high data-rate downlink is needed. The STX uses an open network encoding scheme based on the IntelSAT IESS-308 specification which makes this product compatible with low-cost commercial receivers.

ZOOM

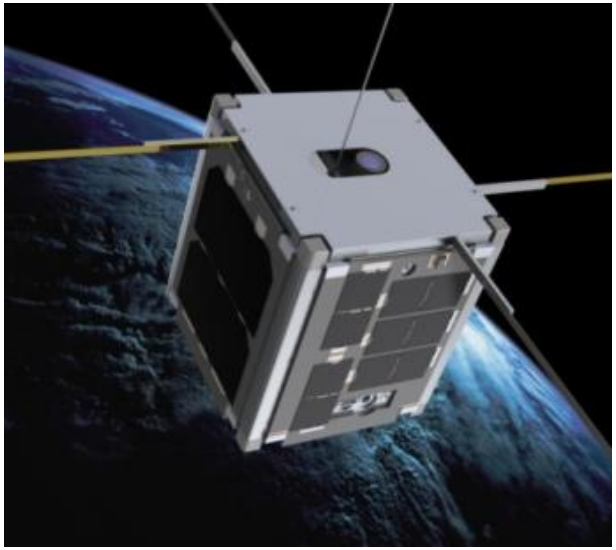
S-Band Patch Antenna

Part number: CS-CPUT-STX-02
Cost: £5,000.00



The S-Band patch antenna can easily be mounted on the nadir facing side of the CubeSat. A wide beamwidth ensures satellite communication from low elevation angles without the need to point the satellite. The antenna exhibits a good input reflection coefficient which allows for efficient radiation of up to 2 W of RF power.

ZOOM



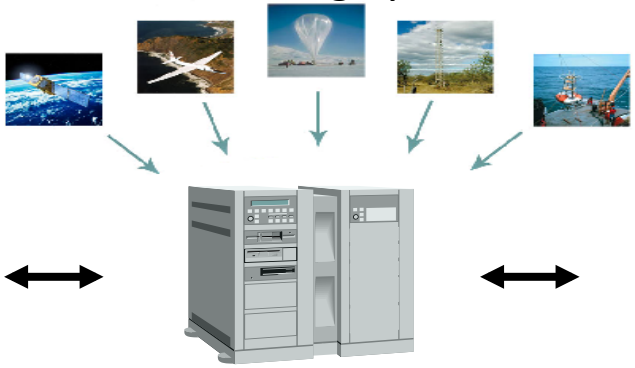
ZACUBE-1 | TshepisoSAT
Exhibited at IAC '11
To launched 2013

Cape Peninsula University of Technology

F'SATI French South African Institute of Technology space

SPACE VALUE CHAIN

Space Application Value Chain



Observing Systems

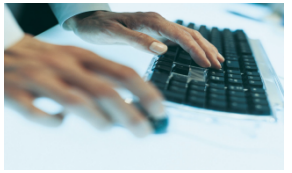
EODC SAEON SDI

Research and Development

Data Processing
Centre of Competence

Human Capital Development

Public Goods



Core Goods

Commercial Goods

INFRASTRUCTURE

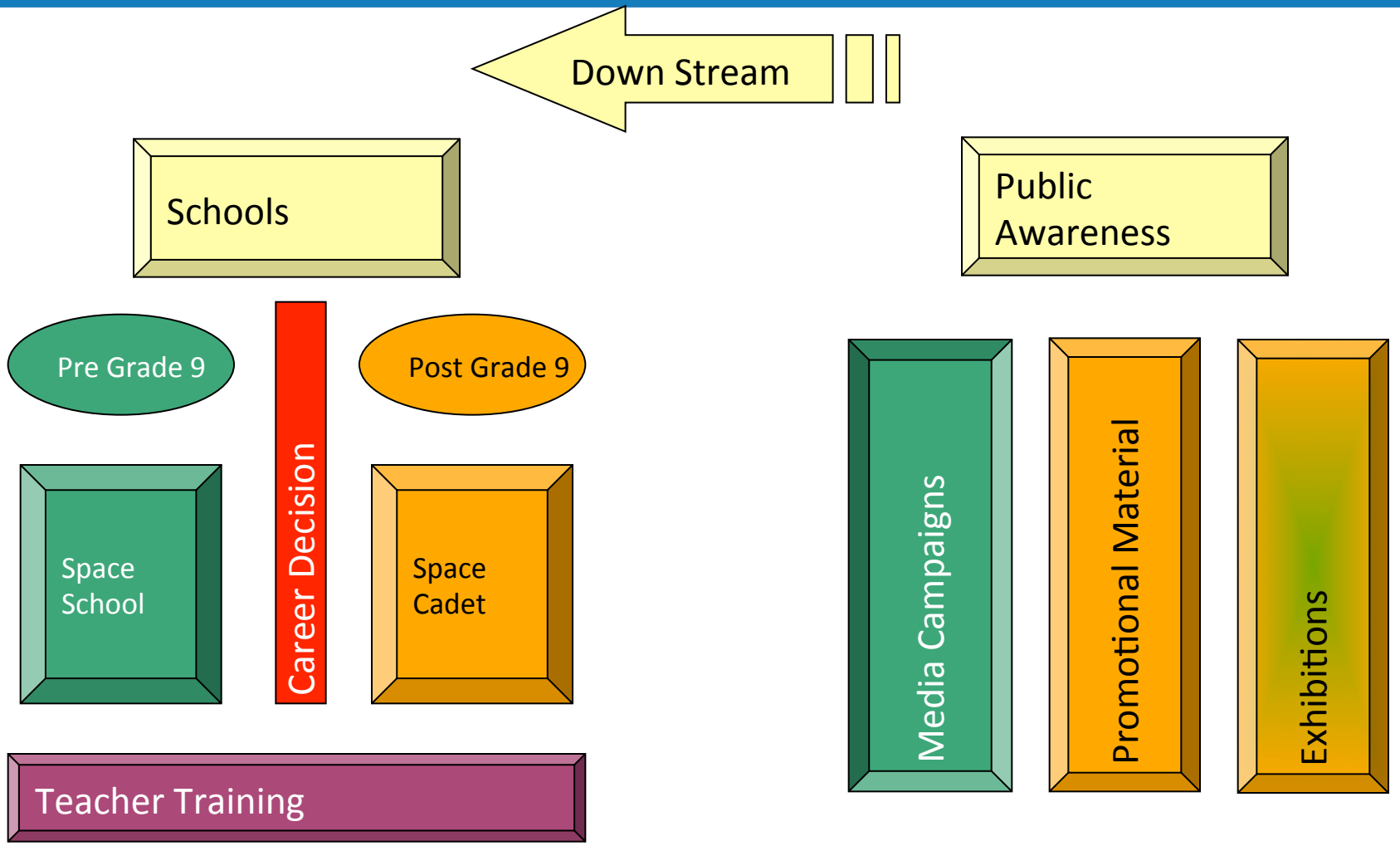
PEOPLE

GOODS & SERVICES

CROSS CUTTING AREAS

Human Capital Development and Outreach

- **Space Awareness and HCD**
  - CPUT satellite engineering training built a Cubesat called Tshepiso.
  - To date 40 students have been trained, 25 in satellite engineering and 15 in remote sensing.
  - Training programmes will respond to the requirements of the national space programme.
  - Engage with learners and the public around the country through numerous national science and technology exhibitions
  - Facilitation of education through space technology, increasing youth interest and uptake of STEM subjects


Down Stream
Schools
Public Awareness
Pre Grade 9
Post Grade 9
Career Decision
Space School
Space Cadet
Media Campaigns
Promotional Material
Exhibitions
Teacher Training

Up Stream

Annual Space Forum

Universities

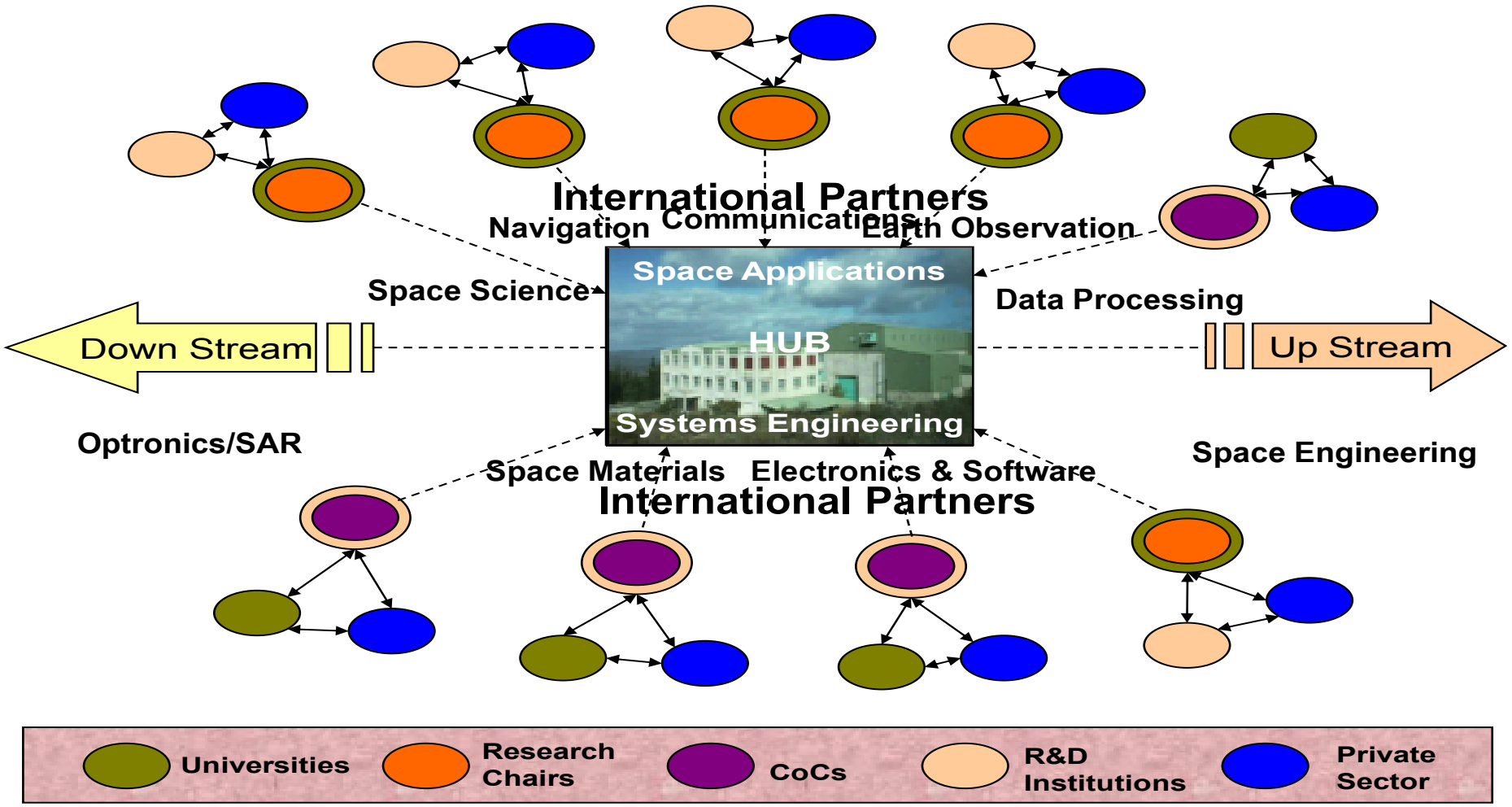
Research Chairs

CoCs

R&D Institutions

Private Sector

Hub and Spoke Model



Future activities

- A fully established space programme (NSP Vision 35)
- Appropriate technology platforms in place to support the building blocks of the national space programme
  - Houwteq facility
    - Upgraded to international standards
    - Facility fully operational
  - Launch of ZA-ARMC1
    - Mission Control Centre operational
- Advances in human capital development that supports the national space programme
- Strengthened strategic partnerships, both local and international, and projects that promote space science and technology R&D; and
- Operational and ongoing developments of space application services and products for all tiers of government and the broader public good
  - Fully functional SAEOSS integrated to the GEOSS
- NBU satellite manufacturing
- CoCs (satellite sensors and data processing).
- Research Chairs (Earth Observation and Engineering)

Strategic Partnerships

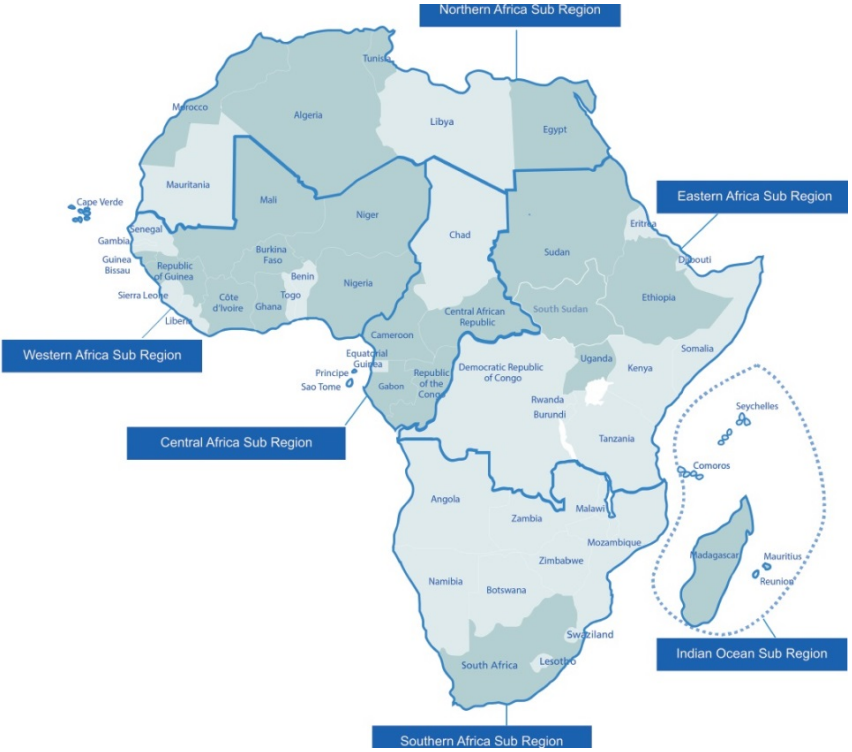
CEOS

Committee
on Earth Observation Satellites

GEO GROUP ON EARTH OBSERVATIONS

Implementing GEOSS in Africa

AfriGEOSS



- Strengthen national and regional coordination and capacity
- Synergies with existing and upcoming international and local initiatives & programmes
- With a focus on:
  - Data and Infrastructure
  - Human Capital Development
  - User Needs and Applications
  - Communication and Outreach
  - Resource Mobilisation

African Space Programme

Thank You