Formalising South Africa’s National Space Programme

Dr V Munsami
Chief Director: Space Science and Technology
Presentation Outline

National Space Programme
- Strategic Context
- Key Focus Areas
- Delivering on the Priorities

SumbandilaSat
- Update
National Instruments

South African Earth Observation Strategy

National Space Policy

South African National Space Agency Act

National Space Strategy
Strategic Context
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 capture a global market share for small to medium-sized space systems

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
Key Focus Areas
Key Focus Areas

- Environmental Resource Management
- Health, Safety and Security
- Innovation and Economic Growth
Key Priority Areas

DPSA   Social Development   Local Government   Correctional Service

Defense
SARS
Police
Health
DEAT
Agriculture

DWAF   Foreign Affairs   Communications   Transport

Public Enterprise   Home Affairs   Safety and Security   DTI

Treasury
Education
Labour
NIA
DME
Justice
Public Works
Sports
Presidency
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
Health, 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
Delivering on the Priorities
Elements Needed

- Satellite navigation
- Earth observation
- Space science and Exploration
- Rural and urban development
- Ocean and coastal management
- Health
- Safety
- Resource management
- Environmental management
- Aviation, rail and maritime development
- Mobile communications
- Telematics
- Tele-education
- Traffic management
- Asset tracking
- Disaster management
- Climate change
- Security
- Mapping
- Meteorology
- Hydrology
- Telemedicine
- Tourism
- Science exploration
- Rural communication

Human capital, infrastructure and international partnerships

Space awareness
Earth observation programmes

- Establish an earth observation data centre
- Develop a platform to integrate satellite and in-situ data
- Develop medium to high resolution payloads
- Establish centres of competence for optronics and synthetic aperture radar
- Develop the African Resource and Environmental Management Constellation in partnership with other African countries
- Consolidate the acquisition of space data for government
## User Requirements

### Key Priority Areas

<table>
<thead>
<tr>
<th>Environmental Resource Management</th>
<th>Specific Needs</th>
<th>Spatial Resolution Required</th>
<th>Temporal Frequency</th>
<th>Geographic Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental and geospatial monitoring</td>
<td>-</td>
<td>&lt;50cm</td>
<td>•</td>
<td>Annual</td>
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<tr>
<td>Ocean, coastal and marine management</td>
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<td>•</td>
<td>Annual</td>
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<tr>
<td>Land management</td>
<td>1m - 2.5m</td>
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<td>•</td>
<td>Seasonal</td>
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<tr>
<td>Rural development and urban planning</td>
<td>2.5m - 5m</td>
<td>•</td>
<td>•</td>
<td>Annual</td>
</tr>
<tr>
<td>Topographic mapping</td>
<td>5m - 10m</td>
<td>•</td>
<td>•</td>
<td>Annual</td>
</tr>
<tr>
<td>Hydrological monitoring</td>
<td>10m - 20m</td>
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<td>•</td>
<td>Twice per annum</td>
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<tr>
<td>Climate change mitigation and adaptation</td>
<td>20m - 30m</td>
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<td>•</td>
<td>Daily</td>
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<tr>
<td>Meteorological monitoring</td>
<td>&gt;30m</td>
<td>•</td>
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<td>Daily when required</td>
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</table>

<table>
<thead>
<tr>
<th>Health, Safety &amp; Security</th>
<th>Specific Needs</th>
<th>Spatial Resolution Required</th>
<th>Temporal Frequency</th>
<th>Geographic Area</th>
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</thead>
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<tr>
<td>Disaster monitoring and relief</td>
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<td>&lt;50cm</td>
<td>•</td>
<td>Daily when required</td>
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<tr>
<td>Hazard forecasting and early warning</td>
<td>50cm - 1m</td>
<td>•</td>
<td>•</td>
<td>Twice per annum</td>
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<tr>
<td>Cross-border risks</td>
<td>1m - 2.5m</td>
<td>•</td>
<td>•</td>
<td>2-4 times per annum</td>
</tr>
<tr>
<td>Disease surveillance and health risk</td>
<td>2.5m - 5m</td>
<td>•</td>
<td>•</td>
<td>Twice per annum</td>
</tr>
<tr>
<td>Asset monitoring</td>
<td>5m - 10m</td>
<td>•</td>
<td>•</td>
<td>Continuous</td>
</tr>
<tr>
<td>Regulatory enforcement</td>
<td>10m - 20m</td>
<td>•</td>
<td>•</td>
<td>2-4 times per annum</td>
</tr>
<tr>
<td>Defence, peacekeeping and treaty monitoring</td>
<td>20m - 30m</td>
<td>•</td>
<td>•</td>
<td>High turn around time</td>
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</tbody>
</table>

<table>
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<tr>
<th>Innovation &amp; Economic Growth</th>
<th>Specific Needs</th>
<th>Spatial Resolution Required</th>
<th>Temporal Frequency</th>
<th>Geographic Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourism and recreation</td>
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<td>•</td>
<td>Annual</td>
</tr>
<tr>
<td>Communication</td>
<td>50cm - 1m</td>
<td>•</td>
<td>•</td>
<td>Continuous</td>
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<tr>
<td>Space science and exploration</td>
<td>1m - 2.5m</td>
<td>•</td>
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</tr>
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<td>Development of the space industry</td>
<td>5m - 10m</td>
<td>•</td>
<td>•</td>
<td>National</td>
</tr>
</tbody>
</table>

### Temporal Frequency

- **Annual**: Occurs once a year
- **Seasonal**: Occurs during specific seasons
- **Daily**: Occurs once a day
- **Twice per annum**: Occurs twice a year
- **Continuous**: Occurs continuously

### Geographic Area

- **National**: Occurs at the national level
- **SADC**: Occurs in the Southern African Development Community
- **Africa**: Occurs at the African level
SPACE APPLICATIONS VALUE CHAIN

National Archive

Observing Systems

SAEOS Portal

SAEON

SDI

EODC

Research and Development

Data Processing Centre of Competence

Human Capital Development

Public Goods

Core Goods

Commercial Goods

INFRASCTURE

PEOPLE

GOODS & SERVICES
SAEOS (The South African Earth Observation Strategy) directly supports the access to and visualization of data dealing with the societal benefit areas identified by GEO.

Funded by the Department of Science and Technology (DST), a platform is being created to serve as a centralised 'catalogue of catalogues', providing access to a vast array of scientific data and knowledge in and about South Africa.
Up Stream

Universities
Research Chairs
CoCs
R&D Institutions
Private Sector

Down Stream

Data Processing
Earth Observation
Communications
Navigation
Space Science
Space Engineering

Optronics/SAR

International Partners

International Partners
GEO Participation

- Co-Chair of GEO (China, EC, USA)
- Committee Co-Chairs
  - Science and technology
  - Capacity Building
  - Co-Chair Coordination Committee (C4)
- Leads
  - Sensor Web
  - GEOBON
CEOS Participation

- Data Access
- Software Tools
- Distribution
- Human Capital
CEOS Participation

CBERS-2B
- SADC reception testing complete
- Ingest software completion by Oct 08
- SADC reception and free dissemination by Nov 08

SAC-C
- Reception testing at SAC successful
- Discussions on free dissemination to SADC underway

Landsat
August 2008: U.S. Secretary of the Interior, Dirk Kempthorne, announced that the 35 years of archived Landsat data will be made available over the web free to the public by the end of the year.

GLOBCOVER

Radarsat Africa Mosaic
CSA committed access to Radarsat Africa mosaic
Update on SumbandilaSat
# Specifications

<table>
<thead>
<tr>
<th>Application</th>
<th>Value</th>
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<tbody>
<tr>
<td>Applications</td>
<td>Earth Observation</td>
</tr>
<tr>
<td>Orbit</td>
<td>Sun-synchronous</td>
</tr>
<tr>
<td>Altitude</td>
<td>500 km</td>
</tr>
<tr>
<td>Inclination</td>
<td>97.4 deg</td>
</tr>
<tr>
<td>Launch Mass</td>
<td>82 kg</td>
</tr>
<tr>
<td>Design Lifetime</td>
<td>3 years</td>
</tr>
<tr>
<td>Imager</td>
<td>6 spectral bands</td>
</tr>
<tr>
<td>Ground Sampling Distance</td>
<td>6.5 m</td>
</tr>
<tr>
<td>Swath</td>
<td>45 km</td>
</tr>
<tr>
<td>Stabilization</td>
<td>3-axis</td>
</tr>
<tr>
<td>Solar Panel Power</td>
<td>65 W</td>
</tr>
<tr>
<td>Peak Power per Experiment</td>
<td>10 W</td>
</tr>
</tbody>
</table>
• Very Low Frequency Experiment
• Radiation Experiment
• Fixed String Vibration Experiment
• Software Defined Radio
• Amateur Radio
• Store and Forward
Mission Statistics

- Number of orbits: >2300
- Weeks in space: 22
- Distance travelled: 0.66 AU
- Activities uploaded: >1600
- Images taken: 120
Sample Images

Buenos Aires (Argentina)
Full scene (60km x 52km)
False colour (NIR, Red)
Sample Images
THANK YOU