PRESENTATION TO
THE PORTFOLIO COMMITTEE ON
SCIENCE & TECHNOLOGY

29 MAY 2007, CAPE TOWN
1. Introduction
   - Mihle
   - Tribute to Prof Garth Milne
   - Sumbandila satellite video
   - Address by a space engineer-in-training

2. Why Space?

3. Human Capital Development in Space

4. SunSpace & other role players in SA

5. Conclusion
Introduction
Siyabongs Copiso
Mihle/SunSpace: Formation Overview

- Mihle/SunSpace
  - SunSpace
    - Students from Sunsat
  - Mihle
    - Students ISSA
Ownership and Control

• **Shareholders/Ownership**
  – 25+1% BEE Empowered (Mihle Consortium)

• **Board of Directors**
  – 8 Directors (3 Executive)
  – Chairman: Sybrand Grobbelaar
  – Managing Director: Bart Cilliers
  – 25% BEE (Themba Vilakazi & Bongani Caga)

• **Executive Management**
  – 33.3% BEE Executive Positions
    (Siyabonga Copiso, Mzukisi Mazula & Ron Olivier)
Tribute to Prof Garth W Milne
Ron Olivier
Sumbandila Satellite Video
Engineer-in-Training
Gladys Magagula
Why Space?

Mzukisi Mazula
# Why space in Developing Countries

<table>
<thead>
<tr>
<th>Areas of Concern</th>
<th>Contribution of space technology</th>
</tr>
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<tbody>
<tr>
<td>Shortage of Technical Skills</td>
<td>• High technology attracts &amp; retains high quality engineers &amp; scientists</td>
</tr>
<tr>
<td>Brain-drain</td>
<td>• Attracts young people to science and maths disciplines – fulfilling careers</td>
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<tr>
<td>(Loss of top scientists &amp; engineers to the developed world)</td>
<td>• Stimulates R&amp;D</td>
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<tr>
<td></td>
<td>• Independent space capability; contributes to world knowledge</td>
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Space in South Africa

• **2007 State of the Nation Address**
  – To speed up the process of skills development
  – To improve our export performance, focusing on services and manufactured goods
  – To increase spending on scientific research and development

• **Human Capital Development**
  – Raises science and technology manpower pyramid
  – Positive impact on universities and industry
  – A basis for scientific international interaction and collaboration

• **Access to independent decision making information**
  – Can be achieved with turnkey satellite system or through own efforts to develop and build a satellite
  – Decision making information allows increasing the economic return of traditional economic sectors

• **International diplomacy and collaboration**
  – Benefit to other countries in case of disaster
  – Contribute to a research “club”, like oceanography
  – Initiate regional large scale resource management initiatives
## Imaging Applications

<table>
<thead>
<tr>
<th>Element</th>
<th>Application</th>
<th>Data Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing resources</td>
<td>Vessels position and identification determination</td>
<td>High spatial resolution and interrogation-communication</td>
</tr>
<tr>
<td>Water quality and levels</td>
<td>Agricultural infrastructure management and planning Disaster monitoring &amp; management</td>
<td>High spatial for water body outline, and extra light-blue-green line for water quality</td>
</tr>
<tr>
<td>Ground water</td>
<td>Agricultural management and infrastructure planning</td>
<td>Medium spatial resolution for seepage line identification</td>
</tr>
<tr>
<td>Ground coverage</td>
<td>Agricultural, deforesting and urbanisation management</td>
<td>High spatial and multi-spectral resolution in more than 3 bands</td>
</tr>
<tr>
<td>Plant health</td>
<td>Plant stress monitoring</td>
<td>Green, red, red-edge and NIR bands needed</td>
</tr>
</tbody>
</table>
Sumbandila Image Expectation

Resolution:
GSD = 6.25m

Size:
5.8 x 4.2 km

Full image:
45 x 45 km

Location:
Kayamandi & Stellenbosch
South African Satellite Technology – 20 years

1985
GREENSAT
Houwteq, Denel

1994
SUNSAT

1991
HTQ/ISSA
Univ. of Stellenbosch

2001
SUNSAT

2005
SunSpace

2000 2001 2005
Sun Space & Info Systems

2007
Mihle
Sun Space & Info Systems
Space Law & Regulations

• **South African Council for Space Affairs**
  (Space Affairs Act No 64 of 1995)

• **South African Non-proliferation Council**

• **National Conventional Arms Control Committee (SA signatory to Wassenaar)**

• **Cabinet has approved the establishment of the SA Space Agency**

• **Internationally: ITU & UNCOPUOS (UN treaties) for frequencies and orbital slots applications and for non-proliferation of space, respectively**
Types of Satellites

- **GEO-Stationary Satellites**
  - Communications
  - Space research

- **Medium Orbiting Satellites**
  - Astronomy
  - Space research

- **Low Earth Orbiting Satellites**
  - Earth Observation (EO)
  - Store & Forward data transfer
Satellite Data Market Review

• **Satellite data**
  - Total Market estimated $500M per annum (conservative)
  - Very high resolution $400M
  - High resolution $80M
  - Medium resolution $20M
  - Replacing the aerial survey market

• **Where does Google earth fit in?**
  - Popularised geospatial backdrop
  - Utilises low value data for new business models
Future Satellite Market

- **Very high resolution national satellites**
  - Global demand from South America to Asia
- **Very high resolution data**
  - 90% of market in USA and middle east
- **Competition**
  - Existing large manufacturers
  - Small satellite manufacturers
- **South African differentiate on**
  - Can provide essential functionality at competitive price = innovation
  - Technology development and know-how transfer
## Space Activities in Africa

<table>
<thead>
<tr>
<th>#</th>
<th>COUNTRY</th>
<th>SPACE AGENCY</th>
<th>SPACE ACTIVITY</th>
</tr>
</thead>
</table>
| 1  | EGYPT     | Space Science and Technology Research Council     | • Owns and controls two telecoms satellites Nilesat 101 & 102, launched in 1998 & 2000, respectively  
• Has an aggressive space program with the following collaborations (ESA, Russia, Canada, Ukraine, etc)  
• EgyptSat1 a scientific satellite & isscheduled for launched in Kazakhstan late in 2007 |
| 2  | NIGERIA   | National Space Research and Development Agency (NASRDA) | • NigeriaSat launched in September 2003  
• Nigeria launched a Chinese built Geostationary Satellite (May 2007)  
• Nigeria planning (LEO) NigeriaSat2 for 2008  
• NASRDA currently building space facilities similar to SA (ISSA/Denel’s Houwteq Facilities) |
| 3  | ALGERIA   | Algerian Space Agency (ASAL)                       | • Alsat1 launched in November 2002  
• ASAL formally expressed interests in the partnering with SA Government and develop joint satellite programs  
• ASAL is planning AlSat2A &B by 2008  
• ASAL, also building space facilities |
Human Capital Development in Space

Siyabonga Copiso
Human Development Strategy

JIPSA: Joint Initiative on Priority Skills Acquisition

- **JIPSA (2007) Report by Deputy President, Ms Phumzile Mlambo-Ngcuka:**
  - Shortage of Engineering skills are in high demand
  - SA produces 1400 engineers and in short 1000 more students

- **Sunspace Initiative:**
  - Through support from DST & DOC, managed Internship
  - Engineering Training for Defense and Intelligence
Space Industry and ASGISA

• **ASGISA targets:**
  – Increase Gross Domestic Product (GDP) by 6%
  – Half unemployment and poverty by 2014

• **Intervention required:**
  – Establishment of SASA
  – Develop a space programme
  – Support for local industry
  – Jobs creation
  – HCD
SunSpace & other role players in SA
Overview

• **Roots in SunSat**

• **80+ employees**
  - 50% Masters & PhDs (project staff)
  - Approx. 50 more involved as contractors
  - 9 engineering and science interns (DST, SAC and DOC sponsored)

• **Expertise**
  - Core of South African satellite expertise
  - Experienced Aerospace & Defence Engineers

• **Culture**
  - Strong sense of innovation
  - “Can do” attitude
## Industry Participation in Sumbandila

<table>
<thead>
<tr>
<th>Name of Company</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>British American Tobacco</td>
<td>70</td>
</tr>
<tr>
<td>Calculus Products</td>
<td>35</td>
</tr>
<tr>
<td>Clip-Lok Sim-Pak SA</td>
<td>12</td>
</tr>
<tr>
<td>Comar International</td>
<td>23</td>
</tr>
<tr>
<td>Daliff Engineering</td>
<td>45</td>
</tr>
<tr>
<td>Denel Optronics</td>
<td></td>
</tr>
<tr>
<td>Dowd Engravers</td>
<td>20</td>
</tr>
<tr>
<td>Flexi-Gear &amp; Engineering</td>
<td>13</td>
</tr>
<tr>
<td>GCC U/S</td>
<td>12</td>
</tr>
<tr>
<td>ITM U/S</td>
<td>30</td>
</tr>
<tr>
<td>Sagex</td>
<td>400</td>
</tr>
<tr>
<td>SED U/S</td>
<td>4</td>
</tr>
<tr>
<td>SMD U/S</td>
<td>6</td>
</tr>
<tr>
<td>Tellumat</td>
<td>100</td>
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<tr>
<td>West Eng Supply Co</td>
<td>13</td>
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<thead>
<tr>
<th>Name of Company</th>
<th>Number of Employees</th>
</tr>
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<tbody>
<tr>
<td>Aeromec Engineering</td>
<td>40</td>
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<tr>
<td>Barry Stott Cases</td>
<td>3</td>
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<tr>
<td>C&amp;C Tooling</td>
<td>3</td>
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<tr>
<td>CHg Engineering</td>
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<tr>
<td>Chromar</td>
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<tr>
<td>Elite Engineering</td>
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<tr>
<td>Fabrinox</td>
<td>50</td>
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<tr>
<td>GRP Tubing</td>
<td>11</td>
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<tr>
<td>Loci Laser Cut &amp;</td>
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<tr>
<td>Manufacturing</td>
<td>12</td>
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<tr>
<td>Proto Engineering</td>
<td>20</td>
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<tr>
<td>Stopak</td>
<td>200</td>
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<table>
<thead>
<tr>
<th>Name of Company</th>
<th>Number of Employees</th>
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<tbody>
<tr>
<td>BJR</td>
<td>10</td>
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<tr>
<td>Clive Wire Cutting</td>
<td>3</td>
</tr>
<tr>
<td>Eikestad Bolt &amp; Nut</td>
<td>3</td>
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<tr>
<td>ISSA</td>
<td>20</td>
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<tr>
<td>M&amp;H Engineering</td>
<td>2</td>
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<tr>
<td>Metal Grapho</td>
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<tr>
<td>Multicam RSA</td>
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<tr>
<td>Pro-Bolt</td>
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<tr>
<td>Schuurmans</td>
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<td>Somchem</td>
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<tr>
<td>Strand Anodizing</td>
<td>2</td>
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<tr>
<td>Techni-Rig &amp; Freight</td>
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<tr>
<td>Theo Marnewick</td>
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<tr>
<td>Engineering</td>
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<tr>
<td>Topfast</td>
<td>8</td>
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<tr>
<td>West Beach Instrumentation</td>
<td>5</td>
</tr>
</tbody>
</table>

### BEE: YES  37.5%  27.5%  BEE: NO
Conclusion
Conclusion

• SunSpace supports the establishment of SASA

• SunSpace supports the Human Capital Investments by Government (DST/DOC/DOD/DOI) through Internships & R&D activities in Universities and Industry

• Key to the success and sustainability of the Space industry in South Africa is
  – Vision
  – HCD
  – R&D
  – Competitive industry
  – Partnerships/Joint Missions
Space - A Catalyst for Development

“There are some who question the relevance of space activities in a developing nation. To us, there is no ambiguity of purpose. We do not have the fantasy of competing with the economically advanced nations in the exploration of the moon or the planets or manned space-flight."

"But we are convinced that if we are to play a meaningful role nationally, and in the community of nations, we must be second to none in the application of advanced technologies to the real problems of man and society."

-Dr. Vikram A. Sarabhai, Father of India's Space Program

“Space can be an instrument of immense inspiration and I cannot overemphasise the impact the can be achieved for our young and very impressive engineers. The gender composition of this group is of great significance in a world where gender bias is so pervasive.”

- Mr Themba G Vilakazi, Chairperson of the Mihle Consortium
THANK YOU!!!

SunSpace Headquarters in Tegnopark, Stellenbosch