



# South African National Space Agency (SANSA) Annual Performance Plan 2018/19



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

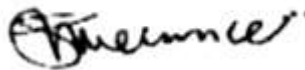


# Foreword

The 2018/19 financial year brings new opportunities for South Africa in the local and international space domain. Notwithstanding the financial challenges faced by the Agency and though the current targets are conservatively aligned to the budgetary allocation, our commitment still remains in positioning the Agency to deliver on its full mandate, as espoused in the National Space Policy and the National Space Strategy. In addition, concerted efforts will be placed on positioning the local space sector to deliver on a continental space agenda, given recent initiatives to formalise an African space programme.

This Annual Performance Plan therefore forms a convenient bridge between a measured approach taken to date in terms of operational focus to exploring a bolder, expansive approach in terms of strategic positioning, including rethinking our current operational approach - where necessary. SANSA has embarked on an organisational culture change exercise and a realignment process of certain elements within the organisational structure, which will be continued into the 2018/19 financial year. It is envisaged that 2018/19 will be a year of consolidation and venturing into new domains that will realise increased growth of the local space sector.

The Board and Management of SANSA remain committed to repositioning SANSA to support a new growth trajectory for the sector through an increased outward focus. This will ensure the development and strengthening of the local space landscape through effective partnerships that focus on new and expanded initiatives. Local and international partnerships will be a key vehicle for such a transformation and this will ensure a more systemic approach in which SANSA's leadership will be critical. The 2018/19 financial year will be a year of exploring new possibilities and we hereby present the 2018/19 Annual Performance Plan for SANSA.



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**Joy-Marie Lawrence**  
**Chairperson of the SANSA Board**  
**Accounting Authority**

## Official sign-off


It is hereby certified that this Annual Performance Plan:

- was developed by the management and Board of the South African National Space Agency (SANSA) in consultation with the Department of Science & Technology (DST);
- was prepared in line with the current Strategic Plan of SANSA; and
- accurately reflects the performance targets that SANSA will endeavour to achieve given the resources made available in the budget for 2018/19.

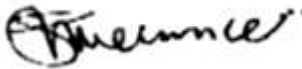
**Ms Bulelwa Pono**  
Chief Financial Officer

Signature:  \_\_\_\_\_

**Dr Valanathan Munsami**  
Chief Executive Officer

Signature:  \_\_\_\_\_

**Ms Joy-Marie Lawrence**  
Board Chairperson  
On behalf of Accounting Authority

Signature:  \_\_\_\_\_

Approved by:

**Ms M T Kubayi-Ngubane**

Signature  \_\_\_\_\_  
**Minister of Science and Technology**  
Executive Authority

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## ACRONYMS

| ABBREVIATION | MEANING  |
|--------------|--|
| AfriGEOSS    | African Group on Earth Observation System of Systems     |
| AIT          | Assembly Integration and Testing Facility                |
| ARMC         | African Resource Management Constellation                |
| AU           | African Union  |
| BRICS        | Brazil Russia India China and South Africa               |
| CBERS        | China Brazil Earth Resource Satellite                    |
| CEOS         | Committee on Earth Observation Satellites                |
| COSPAR       | Committee on Space Research                              |
| CSP          | Corporate Support Programme                              |
| DST          | Department of Science and Technology                     |
| EISCAT       | European Incoherent Scatter Scientific Association       |
| EODC         | Earth observation Data Centre                            |
| EOP          | Earth Observation Programme                              |
| ESA          | European Space Agency                                    |
| EVP          | Employee Value Proposition                               |
| GEO          | Group on Earth Observation                               |
| GEOGLAM      | Group on Earth Observation Global Agriculture Monitoring |
| GICs         | Geomagnetically Induced Currents                         |
| GPS          | Global Positioning System                                |
| HCD          | Human Capacity Development                               |
| HF           | High Frequency   |
| IAF          | International Astronautical Federation                   |
| ICAO         | International Civil Aviation Organisation                |
| ICT          | Information Communication Technology                     |
| ISES         | International Space Environment Service                  |
| LEO          | Low Earth Orbit  |
| MODIS        | Moderate Resolution Imaging Spectro radiometer           |
| MTEF         | Medium Term Expenditure Framework                        |
| MTSF         | Medium- Term Strategic Framework                         |
| NASA         | National Aeronautics and Space Administration            |
| NASSP        | National Astronomy and Space Science Programme           |
| NDP          | National Development Plan                                |
| NEOP         | National Earth Observation Programme                     |
| NRF          | National Research Foundation                             |
| NSEP         | National Space Engineering Programme                     |
| NSOP         | National Space Operations Programme                      |
| NSP          | National Space Programme                                 |
| NSS          | National Space Strategy                                  |
| NSSP         | National Space Science Programme                         |
| PNT          | Positioning Navigation and Timing                        |
| R&D          | Research and Development                                 |
| SAASTA       | South African Agency for Science and Technology          |
| SADC         | Southern African Development Community                   |
| SAEOS        | South African Earth Observation Strategy                 |
| SARB         | South African Reserve Bank                               |
| SCAR         | Scientific Committee on Antarctic Research               |
| SEP          | Space Engineering Programme                              |
| SET          | Science Engineering and Technology                       |
| SMEs         | Small Medium Enterprises                                 |
| SMMEs        | Small Medium and Micro-sized Enterprises                 |
| SOP          | Space Operations Programme                               |
| SSP          | Space Science Programme                                  |
| STEM         | Science, Technology, Engineering, Mathematics            |
| STI          | Science Technology & Innovation                          |

## EXECUTIVE SUMMARY

SANSA's vision is to position "South Africa as an international hub for space solutions for the world of the future" and the mission of the Agency is to "Lead and inspire the South African Space community to create a better future." To achieve this, SANSA has five strategic goals:

- Goal 1: Address South Africa's challenges through space services and products
- Goal 2. Lead high-impact collaborative R&D on a national scale
- Goal 3. Develop national human capacity and ensure transformation
- Goal 4. Enhance the competitiveness of the South African space industry
- Goal 5. Develop active global partnerships

SANSA implements its five strategic goals by clustering its activities across five broad strategic programmes, as listed below:

- Programme 1: Administration Support Programme,
- Programme 2: Earth Observation Programme,
- Programme 3: Space Science Programme,
- Programme 4: Space Operations Programme, and
- Programme 5: Space Engineering Programme.

The National Development Plan (NDP), the National Space Strategy (NSS), the South African Earth Observation Strategy (SAEOS) and other relevant strategies and policies of government informs the strategic focus of SANSA. For example, the creation of high-technology jobs; the improvement of geospatial information to support the development of marginalised communities; promote the planning and monitoring of vital national infrastructure; and provide critical health, safety and security data are ways by which SANSA contributes to the NDP.

A key challenge in delivering on these various policies/strategies is the suboptimal funding levels that are allocated to SANSA. This has resulted in SANSA not meeting its full mandate and consequently being selective about the suite of activities it can actually implement. This Annual Performance Plan is aligned to the current level of funding allocated to SANSA.

## Key Deliverables for the Year

1. SANSA will deliver the following **four high-impact products and services** (i) Sensor portfolio and data products; (ii) national land-use and land-cover base datasets; (iii) space weather products and services; (iv) magnetic technology products and services.
2. SANSA will aim to achieve a **research productivity score of 1 300**, which is a composite score based on publications, graduated students, research funding, and researcher rating achieved (see Annexure for further explanation).
3. SANSA will provide support to approximately **50 students and interns** for studies in Earth Observation, Space Science, and Space Engineering.
4. SANSA will aim to **generate about R58 million from both national and international space operations contracts**.
5. If the satellite programme funding is received, SANSA aims to continue to **support about 55 external jobs** and **out-source R50 million to the broader space industry** and **R10 million to SMEs** through the satellite-build programme.

## PART A: STRATEGIC OVERVIEW

### VISION

South Africa to be an international hub for space solutions for the world of the future.

### MISSION

Lead and inspire the South African space community to create a better future.

### STRATEGIC GOALS

SANSA has five strategic goals as a means of achieving its mandate. These goals reflect SANSA's strategic intent to lead, coordinate and drive programmes in collaboration with national partners to achieve SANSA's legislated mandate and the attainment of key national priorities in line with the NSS.

SANSA implements its five strategic goals by clustering its activities along five broad strategic programmes as listed below:

- Programme 1: Administration Programme
- Programme 2: Earth Observations Programme
- Programme 3: Space Science Programme
- Programme 4: Space Operations Programme
- Programme 5: Space Engineering Programme

Each of the programmes contributes in varying degrees to the strategic goals as indicated in the table below.

| PROGRAMMES  |                |                   |               |                  |                   |
|---|----------------|-------------------|---------------|------------------|-------------------|
| Strategic Goals   | Administration | Earth Observation | Space Science | Space Operations | Space Engineering |
| Address South Africa's challenges through space services and products |                | ✓                 | ✓             | ✓                | ✓                 |
| Lead high-impact collaborative R&D on a national scale                |                | ✓                 | ✓             |                  | ✓                 |
| Develop national human capacity and ensure transformation             |                | ✓                 | ✓             | ✓                | ✓                 |
| Enhance the competitiveness of the South African space industry       |                | ✓                 |               | ✓                | ✓                 |
| Develop active global partnerships                                    | ✓              | ✓                 | ✓             | ✓                | ✓                 |

### Strategic Goal 1: Address South Africa's challenges through space services and products

Space plays a crucial role in providing operational applications or solutions that will address national challenges through the provision of decision support tools for government. These include applications in natural resource management, climate change and environmental management, disaster management, rural development and urban planning, national safety and security. Achieving this strategic goal is in alignment with the DST strategic goal of accelerating inclusive development through scientific knowledge, evidence and appropriate technology. By contributing to these products and services and decision-support tools, SANSA strengthens or improves the delivery of various government services or functions. ***The primary objective is to ensure that space-based information is integrated into service delivery platforms, within industry and government, as indispensable tools for decision-making and policy formulation.***



### **Strategic Goal 2: Lead high-impact collaborative R&D on a national scale**

High quality impactful research and development leads to the development of sustainable space-based applications that bring benefit to the nation. A close collaboration will be developed, through engagement with various public and private sector institutions in South Africa, in areas of space science and technology to meet the broader user requirements of these sectors. SANSA is committed to the creation of new research and development initiatives to support the wider space community and promote the growth of innovative solutions through linkages with other government agencies. Therefore, SANSA will foster and lead collaborative research and development (R&D) in space related areas on a national scale. ***The prime objective is to increase the national research output in the space science and technology sector through supporting R&D initiatives.***

### **Strategic Goal 3: Develop national human capacity and ensure transformation**

For the national space programme to be sustainable, and deliver on its targets, there is a need to ensure that the appropriate skills base is in place. This will require SANSA to support building capacity in the STEM (science, technology, engineering, mathematics) areas and thus create the pipeline of students for developing the high-tech skills needed to meet national demand in the space sector. Capacity development in space related areas will not only benefit space, but will also have a spill over effect into other productive sectors that require skilled scientists, engineers, and technicians. This will support the job creation priorities of the country and thereby strengthen the economic growth potential of South Africa. ***The primary focus will be on the development of high-end skills and expertise both for the space sector and other industrial sectors.***

### **Strategic Goal 4: Enhance the competitiveness of the South African space industry**

The global space industry is growing at a rapid rate and is estimated at over USD 300 billion. It is an industry that drives new technologies and innovation, giving rise to applications that go beyond space systems, for example, impacting sectors such as medicine, manufacturing, security, and energy. One of the objectives of the NSS is for South Africa to capture a reasonable share of the global space market, an endeavour that will create new opportunities and help grow the national space sector. This needs to be done in concert with other industrial policies and strategies, such as the Industrial Policy and Action Plan (IPAP). ***The primary focus will be on expanding space activities beyond the borders of South Africa to grow SANSA's market share of the global space sector.***

### **Strategic Goal 5: Develop active global partnerships**

Space science and technology, by its nature, can only be effectively undertaken as part of a global partnership. South Africa, through SANSA, must position itself as a strategic partner for the African continent and with other global players in space science and technology. In line with South Africa's foreign policy agenda, partnerships with African countries will be prioritised over the next five years through supporting the development of Science, Technology and Innovation (STI) capacities in Africa. Internationally, SANSA will work with various partners, actively taking part in multi-national projects and forums, and continue to service a number of memorandums of understanding/agreements. SANSA will also enter into new strategic partnerships, at an inter-agency level, with a view to broadening access and creating opportunities for the national space sector. ***The primary focus will be on fostering international partnerships, both on the African continent and abroad, to unlock opportunities for the national space sector.***

## VALUES

The values adopted by SANSA are core to its effective transformation into high performing agency. SANSA subscribes to the following six “STRIPE” values:

1. **Service**- deliver superior customer value on time every time;
2. **Teamwork**- consult, inform and share knowledge;
3. **Respect** - acknowledge and value what is good;
4. **Integrity**- keep promises and own up to mistakes;
5. **Personal Growth**- acknowledge potential and grow competence; and
6. **Excellence**- go the extra mile and implement tasks to the best of our ability.

## UPDATED SITUATIONAL ANALYSIS

### The Current Global Space Environment

#### Introduction

The Global space environment is changing very fast and requires developing countries to come up with strategies that will increase their individual participation in space activities. Key to this is the local and Foreign Direct Investments in national space programmes. Joint satellite development programmes are also key in making sure that developing countries become serious players in the space industry. Regional and international/multinational partnerships also play an important role. Developing countries need to make sure that their voices are heard at, for example the United Nations Committee on the Peaceful Uses of Outer Space and the International Telecommunications Union, in order to influence the international regulations to protect and favour them.

#### Global Trends

Each year, SIA (Space Industry Association) publishes the leading analysis of the satellite industry's economic performance.

The 2016 State of the Satellite Industry Report is SIA's nineteenth annual summary of the industry. The Report is derived from proprietary surveys of satellite companies, in-depth public information, and independent analysis, which are combined to assess the performance of four satellite industry sectors: satellite services, satellite manufacturing, satellite launch services, and satellite ground equipment.

The 2016 State of the Satellite Industry Report includes the following results:

Satellite Services revenues increased by 4% globally from 2014 to 2015, reaching \$127.4 billion, powered by continued growth in consumer satellite television, satellite broadband and Earth observation services.

Satellite Manufacturing revenues, reflecting the value of satellites launched in 2015, grew by 4% worldwide to \$16.6 billion. There were orders for 17 commercial GEO satellites with 11 orders won by U.S. manufacturers for a domestic market share of 65% , up from 57% in 2014.

Satellite Launch Services Industry revenues, which include revenues for all commercially completed launches that occurred in 2015, decreased by 9% from 2014 to 2015. In 2015, 202 satellites were launched compared with 208 launched in 2014, and the number of commercially procured launches conducted worldwide decreased to 65 from 73 in 2014. This is probably a sign of fiscal pressures experienced in the industry and is expected to turn around given the growing requirements for satellite services.

Satellite Ground Equipment revenues rose by 1% over 2014 to reach \$58.9 billion. Satellite navigation (GNSS) equipment for both consumer and industrial customers represented approximately 53% of the overall ground equipment revenue.

#### African Space Activities

A growing number of African countries are establishing their own national space agencies. Kenya recently launched a national space agency. Ghana launched its first student built Cubesatellite. Nigeria and Algeria continue to lead the area of satellite development and Earth Observations (EO) satellites being launched. South Africa is busy with an EO satellite-build programme and the Operations Phakisa Cubesat Missions. South Africa also recently signed and launched its BRICS partnership specifically focusing on space matters, which could potentially be leveraged for Africa. These are all efforts by African countries to develop the space industry on the African continent. It is expected that in 10 years' time this picture will be

different as more countries are expected to launch their respective national space programmes.

SANSA will also strategically drive the establishment of a Committee of African Space Institutions (CASI) to provide the bottom-up impetus for implementation of an African space programme. This will ensure that leading space agencies collectively define and implement flagship programmes that will advance the development of space applications and technologies on the continent. Programmes such as AfriGEOSS, the African Instrumentation Network and the African Resource Management Constellation (ARMC) will become a prime focus along the implementation path for CASI.

### Space Industry Trends

- For many years, global EO services were offered by a limited number of operators;
  - Typically founded and financed by the space industry with the objective of providing high resolution satellite imagery
  - Medium to large satellites with on-board data processing and advanced, custom-designed payloads
  - Governments as primary customers
- New competitors and new partnerships have recently emerged
  - Typically founded and financed by IT/analytics/tech sector to provide web-accessible and frequently updated imagery
  - Smaller satellites, with lower costs of manufacture, launch, and operation, supplemented with sophisticated ground-based data analytics
  - Customer base is developing
  - Planet Labs acquired BlackBridge satellites and data library; UrtheCast purchased Deimos satellites and data
  - DigitalGlobe recently entered a joint venture with Saudi Arabia-based TAQNIA for a small constellation
- Investment driven by interest in business intelligence products from satellite imagery
  - 2015 a record-setting year with investment in start-up space ventures of \$2.3 billion
  - Several EO firms received venture capital investment in 2015: BlackSky Global, GeoOptics, Hera, OmniEarth, Planet Labs, Satellogic, Spire Global

## SANSA's Interface in the NSI Landscape

### Stakeholder Relations

SANSA has a significant footprint within the NSI and has linkages to six key stakeholder groups, namely:

- (i) Government departments with an interest in space-related activities, including but not limited to the DST, to which the Agency reports;
- (ii) Government departments and entities that fulfil some agency function e.g. funding agencies;
- (iii) Government departments and entities that SANSA supports in one form or the other;
- (iv) Partner R&D institutions;
- (v) Industry partners and clients; and
- (vi) Students, educators and the public.

### National Development Plan and MTSF

The key policy instrument of government is the Medium Term Strategic Framework (MTSF) Outcomes. Government has adopted the 2014-2019 MTSF, as the first five-year building block towards realising the 2030 Vision in the NDP. The MTSF lists 14 key outcomes, as well as associated activities and targets, to be achieved by 2019 that cover the focus areas identified in the NDP. There are eight outcomes on which SANSA can make a direct impact and these include:

- **Outcome 1: Quality basic education** – The initiatives in this outcome include sustaining and accelerating improvements in school performance. Satellite technologies can assist the Department of Basic Education to design digital classrooms to assist remote and rural located learners in accessing learning material. This quality lesson can assist in improving and increasing school performance results.
- **Outcome 3: All people in South Africa are and feel safe** – This outcome can be achieved only if South Africa’s borders are effectively defended and secured, an area in which SANSa can contribute. Earth observation satellites provide information on monitoring cross -border theft, drug trafficking and African peace-keeping, as well as crime prevention and national security monitoring. The use of space technologies and space weather information also contributes to the protection of South Africa’s borders and other security related applications.
- **Outcome 4: Decent employment through inclusive economic growth** – Key targets in this outcome include growing the economy rate to above 5%, achieving much higher levels of employment creation and more rapidly reducing inequality. SANSa will make a meaningful contribution towards the achievement of this outcome through satellite manufacturing as a potential employment generator.
- **Outcome 5: A skilled and capable workforce to support an inclusive growth path** – SANSa will contribute to building an inclusive society and a growing and competitive economy through fundamental and applied science and human capital development by creating new knowledge and highly skilled individuals. The SANSa FUNDISA Disk resources, provides students and learners with an overview of and gateway to remote sensing and Earth observation technologies.
- **Outcome 6: Comprehensive rural development and land reform** – SANSa will advocate the use of space technology to improve access to quality basic infrastructure and services, particularly education, in remote, rural and infrastructure-challenged regions of our country. Partnerships and collaboration that promote cost-effective satellite enabled distance-learning programmes independent of ground-based infrastructure, will help ensure connectivity across physical boundaries to bridge the gap between the “haves” and “have-nots”.
- **Outcome 8: Sustainable human settlements and improved quality of household life** – SANSa will provide government with satellite-derived products, such as the National Human Settlements Layer, to clearly map human settlement patterns, specifically the dynamics of informal settlements. This will improve the linkages between human settlements planning, economic and commercial development and spatial planning frameworks to guide investment decisions, increase integration and improve the location of human settlements.
- **Outcome 9: A responsive, accountable, effective and efficient local government system** – The expected central focus is sustainable and reliable access to basic services. SANSa will equip municipalities and local governments to extend basic services to millions of households by providing national geospatial support data products, as well as national land-use and land-cover products. GIS and Remote Sensing (RS) technologies will assist government to make better decisions and monitor service delivery progress.
- **Outcome 10: Environmental assets and natural resources that are well-protected and continually enhanced** – Government must improve decision-making tools and harness research and information management capacity to identify, develop and maintain datasets to generate policy-relevant statistics, indicators and indices to achieve this outcome. Globally, space-based systems are critically important for risk prediction and mitigation. Space technologies are crucial to providing operational applications or solutions that address national challenges, as well as decision support tools for government. These include applications in natural resource management, climate change, environmental management and disaster management. SANSa will

ensure that space-derived solutions are integrated into service delivery for the benefit of society.

### National Space Strategy

The NSS is a national road map and implementation framework for a viable and sustainable national space programme. The NSS, as approved by Cabinet in 2008, sets national goals and objectives for space science and technology. The table below indicates the alignment of SANSA's strategic goals with the objectives of the NSS:

| No | National Space Strategy Objectives  | SANSA's Goal Alignment |
|----|---|------------------------|
| 1  | Developing the local private space science and technology industry sector   | Goal 4                 |
| 2  | Developing services and products that can respond to user needs   | Goal 1                 |
| 3  | Satellite or services offered from existing facilities  | Goal 1 and 2           |
| 4  | Organising some of the current space science and technology activities into strategic programmes  | Goal 2                 |
| 5  | Optimising the organisation of future space activities to respond to opportunities with international industrial partners or international space agencies                       | Goal 5                 |
| 6  | Partnerships with established and developing spacefaring countries for industrial and capacity development purposes   | Goal 2, 3 and 5        |
| 7  | Strengthening training and technology transfer programmes, including the sharing of experience and expertise  | Goal 3 and 4           |
| 8  | Promoting space science and technology in academic institutions and science centres and the provision of opportunities for both short-term and long-term training and education | Goal 3                 |
| 9  | Responding to challenges and opportunities in Africa  | Goal 5                 |
| 10 | Advocating the importance of space science and technology as a priority measure for meeting national development needs  | Goal 1 and 3           |
| 11 | Building local awareness of space science and technology  | Goal 1, 2, 3 and 4     |

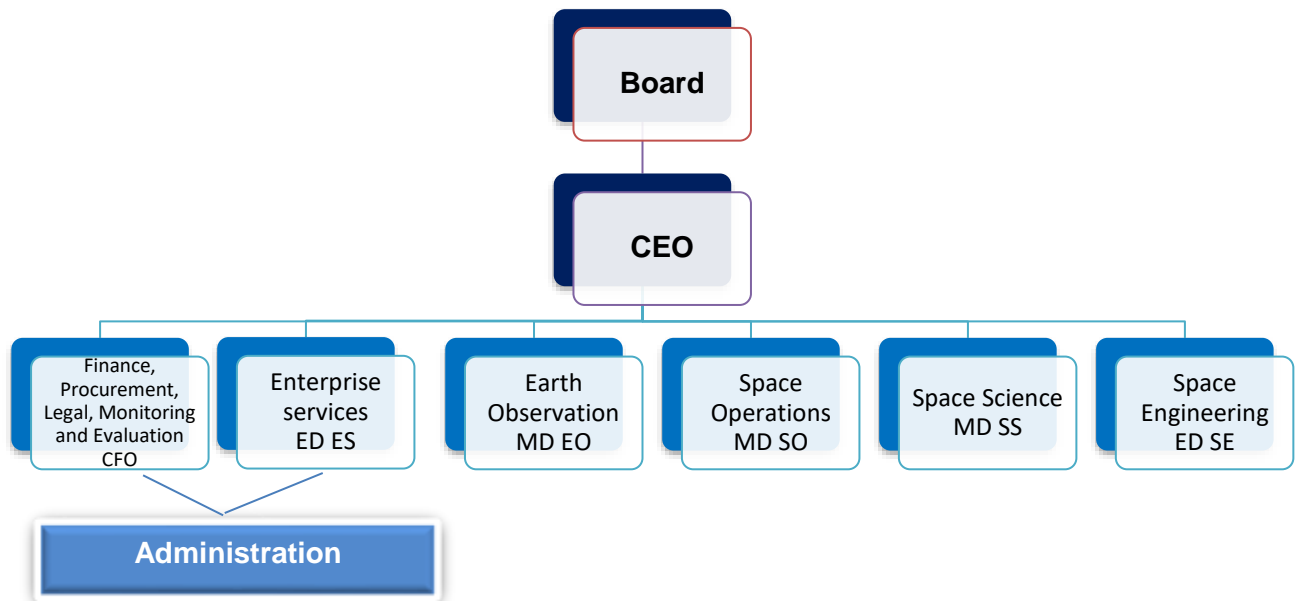
### Alignment to the DST Priorities

SANSA reports to the DST and contributes to the DST key priorities as follows:

| Key DST Outputs                 | SANSA Contribution   |
|---------------------------------|--|
| Knowledge Outputs               | Aim to achieve a research productivity score of 1300, which is a composite score based on publications, graduated students, research funding, and researcher rating achieved   |
| Knowledge Applications Products | Deliver the following four high-impact products and services (i) sensor portfolio and data products, (ii) national land-use and land-cover base datasets, (iii) space weather products and services, (iv) magnetic technology products and services            |
| Postgraduate Student Training   | Provide support to approximately 50 students for postgraduate studies  |
| Leveraging Partnerships         | Generate an equivalent of 3% of SANSA's non-commercial operating revenue through partnerships  |
| Commercial outputs              | Generate about R65 million from both national and international space operations contracts. Support about 55 external jobs and out-source in excess of R50 million to the broader space industry and R10 million to SMEs through the satellite build programme |

### ORGANISATIONAL ENVIRONMENT

During the 2017/18 financial year, the reporting structure has been realigned to allow for programme oversight at the CEO level. The key programme structure did not change. The high-level organogram is shown in the Figure below.



## REVISIONS TO LEGISLATIVE AND OTHER MANDATES

The South African National Space Agency legislation and other mandates that directly relate to SANSA have not changed. However, the Space Affairs Act (Act 83 of 1993) is being redrafted and Cabinet approval thereto will be sought in 2018/19. Material changes are expected with respect to regulations affecting the national space industry. Such changes will be considered during the implementation phase of SANSA's programmes and activities that involve the local space industry.

## PERFORMANCE DELIVERY ENVIRONMENT

During the first six years of SANSA's operations, its Annual Performance Plans and Strategic Plans have been pragmatically aligned against the budgetary allocations made to it for both its internal business operations and broader support to the national space sector. This approach vis-à-vis the frugal budgetary allocations imposed a limitation on SANSA's scope of initiatives that were planned and implemented versus implementation of initiatives actually needed to achieve its full mandate. Such limitation had the following impact:

- SANSA's inability to fully meet its mandate, especially with regards to global navigation satellite services (GNSS) and satellite telecommunications solutions and applications;
- Limited support to the local space industry, as per SANSA's mandate, due to funding constraints; and
- As an implementing agency, SANSA's salary bill accounts for its major cost.

This situation necessitates that SANSA receives an appropriate and sustained base-funding to support its mandate. However, this warrants that SANSA defines a predetermined strategic direction that will inform its funding requirements to support the national space sector and its growing internal operations. In its effort to support the local industry, SANSA will work with the broader space industry.

### Impact on Key Strategic Programmes:

The funding constraints remain and are affecting the implementation of the National Space Strategy and impacting on key performance indicators. The following major key cost drivers for SANSA operations still prevail as pressure points in the SANSA budget as the baseline funding still remains insufficient. The key cost drivers are mainly:

### **Cost of access to Earth observation satellites.**

South African does not own an Earth observation satellites and has to rely on other countries satellites for its geospatial information requirements. Commercial agreements with international suppliers have to be concluded to obtain access to the satellite and or request high resolution images on demand. Currently the SPOT (French: Satellite Pour l'Observation de la Terre, "Satellite for observation of Earth") series of satellites are utilised for the country coverage and this has been in use since early 2000 for the annual mosaic and other applications for the country's needs. Licence fees to access the satellite have now significantly increased over the past three years from R16 million per annum in 2012 for the SPOT 5 satellite to R36 million per annum from 2013 for the SPOT 6&7 satellites for a negotiated multi user licence agreement. This is a major cost element in the goods and services budget and a pressure point that cannot be sustained at the current budget levels. The SPOT 6&7 licence agreement has a few months remaining, should funding not be forthcoming, the impact will be catastrophic to continuing with the national geospatial information for South Africa as the renewal of this licence or an acquisition of another sensor will be problematic for SANSA.

### **Cost of maintaining data storage facilities**

The cost of maintaining the ICT Infrastructure for the data and imagery archive and storage facilities, data processing and management systems, access to communication networks, running the ground station facility and maintaining observation networks across the country and the remote islands for research purposes are growing in significance as these are becoming prone to technology obsolescence and require upgrading and/or replacements at shorter intervals. Most of these assets are currently at zero carrying book values in the balance sheet as they have exceeded their useful lives. Currently there is no budget available to replace and efficiently maintain these assets.

### **Cost of attracting and retaining high end skills**

The employee cost budget is significantly under pressure due to the funding challenges. This leads to the cost of retaining high end skills, comprising mainly scientists and engineers, becoming a challenge as there are limited programmes to pursue to ensure that scientists and engineers are gainfully employed.

### **Continuation of the Earth Observation Satellite Development Programme (EO-Sat 1)**

The current Earth Observation Satellite Development programme (EO-Sat 1) is one of the key flagship projects that SANSA is undertaking for South Africa, as part of the broader National Space Programme in implementing the National Space Strategy and contribution to the ARMC African Resource Management Constellation (ARMC). This is currently funded from the Economic Competitiveness Support Package (ECSP) fund. The fund reached its end in 2017/18. Beyond that, there is uncertainty and the current satellite development project is at risk.

The DST has indicated that there is still commitment to support the satellite development project to its completion and further to this, it is formulating a proposal for the continuation of the ECSP funding and also undertaking discussions with the National Treasury for the broader National Space Programme projects in pursuit of the economic competitiveness of the space industry and its development.

### **Associated performance impact and quantification**

The key performance indicators that are at risk in the implementation of the strategy are as follows:

#### **T1.1 Total of 22 national high-impact operational space related products & services by end March 2020**

- National geospatial decision support data products – unaffordability of satellite imagery will impact the ability to deliver geospatial information supporting various



departments and entities in their service delivery mandates, key decisions and policy support tools

T2.1 Research productivity score of 1500 per annum by end March 2020

- Research outcomes are dependent on the availability of historical and mostly current satellite imagery or data stock for space supported national research programmes.

T4.2.1 A total of 70 direct jobs supported per year externally through SANSA programme contracting

- 70 external jobs currently supported by the programme will cease as these are linked to the satellite development programme

T4.2.2 The achievement of key project milestones in the EO-Sat1 development

- The satellite build cannot be completed if funding for the MTEF is not confirmed

T4.2.3 A total contract expenditure of R58.2 million to SMEs for core space projects

- Targeted contracting to SME's of R10 million in the broader space industry will cease

T4.2.4 The total contract expenditure of R275 million to the broad space related industry for core space projects

- The space industry cannot be stimulated for growth where funding is not forthcoming. This KPI is at risk as the satellite programme funding is not confirmed. Contracting with key industry players in the satellite build programme will cease

## CONSOLIDATED PERFORMANCE OUTPUTS

The tables below present the consolidated performance outputs of SANSA for the five strategic goals over the period 2015 to 2020.

| 2015/2020 Strategic Outcome Oriented Goals – Annual Targets                          |   |   |  | Audited Actual Performance            | Audited Actual Performance              | Estimated Performance | Medium-Term Targets |             |         |
|--|---|---|--|---------------------------------------|---|-----------------------|---------------------|-------------|---------|
| Strategic Goal   | Strategic Objective   | Key Performance Indicator/Measure   | Strategic Plan Five-Year Target  | 2015/16                               | 2016/17                                 | 2017/18               | 2018/19             | 2019/20     | 2020/21 |
| <b>Goal 1: Address South Africa's challenges through space services and products</b> | S1.1 Lead and facilitate the creation of high-impact applications to address society's needs and challenges | M1.1 The number of national high-impact applications                      | T1.1 Total of 22 national high-impact operational space related applications by March 2020 | 4<br>(Target – 4)                     | 5<br>(Target – 5)                       | 5                     | 4                   | 4           |         |
| <b>Goal 2: Lead high-impact collaborative R&amp;D on a national scale</b>            | S2.1 Increase the national space research output  | M2.1 The national research productivity score for space support R&D       | T2.1 Research productivity score of 1500 per annum by March 2020                           | 1992<br>(Target – 750)                | 1656<br>(Target – 950)                  | 1200                  | 1300                | 1500        |         |
| <b>Goal 3: Develop national human capacity and ensure transformation</b>             | S3.1 Increase youth awareness of science  | M3.1 The number of youth directly engaged                                 | T3.1 Total of 53300 young people directly engaged by March 2020                            | 18 769<br>(Target - 8000)             | 18 782<br>(Target – 9000)               | 12 000                | 10800               | 13500       |         |
|  | S3.2 Support students and interns   | M3.2 The number of students and interns supported for formalised training | T3.2 Total of 260 students supported for formalised training by March 2020                 | 53<br>(Target - 40)                   | 87<br>(Target – 50)                     | 70                    | 50                  | 50          |         |
| <b>Goal 4: Enhance the competitiveness of the South African space industry</b>       | S4.1. Generate greater benefit for the space programme through space operations activities                  | M4.1.1 Successful satellite pass monitoring rate for Earth observation    | T4.1.1 Successful satellite pass monitoring maintained at a rate of 98% by March 2020      | 99.7%<br>(Target - 97%)               | 99.98%<br>(Target - 98%)                | 98%                   | 98%                 | 98%         |         |
|  |   | M4.1.2 Total income generated from space operations activities            | T4.1.2 Total income of R281 million generated from space operations                        | R77 million<br>(Target - R58 million) | R66.7 million<br>(Target – R60 million) | R44 million           | R58 million         | R61 million |         |

| 2015/2020 Strategic Outcome Oriented Goals – Annual Targets |                                       |   |  | Audited Actual Performance              | Audited Actual Performance            | Estimated Performance  | Medium-Term Targets  |   |         |
|---|---------------------------------------|---|--|---|---------------------------------------|--|--|---|---------|
| Strategic Goal  | Strategic Objective                   | Key Performance Indicator/Measure   | Strategic Plan Five-Year Target  | 2015/16                                 | 2016/17                               | 2017/18  | 2018/19  | 2019/20   | 2020/21 |
|   |                                       |   | activities by March 2020   |   |                                       |  |  |   |         |
|   | S4.2 Grow the national space industry | M4.2.1 The number of direct jobs supported externally through SANSA programme contracting         | T4.2.1 A total of 70 direct jobs supported externally through SANSA programme contracting <sup>1</sup> by March 2020                         | 53<br>(Target 40)                       | 52<br>(Target – 50)                   | 55   | 55   | 70  |         |
|   |                                       | M4.2.2 The progress status on the EOSat1 development  | T4.2.2 90% progress based on key defining milestones as per project lifecycle culminating in the launch of EOSat1 by March 2020 <sup>1</sup> | 21%<br>(Target - 25%)                   | 37%<br>(Target – 50%)                 | 50% Preliminary Design Review (PDR) completed for the Space System | 70% Critical Design Review (CDR) completed for the Space System Flight Model | 90% Completion of the qualification phase and flight models |         |
|   |                                       | M4.2.3 The total contract expenditure to SMEs for core space projects                             | T4.2.3 A total contract expenditure of R60.1 million for core space projects <sup>1</sup> by March 2020                                      | R7.8 million<br>(Target – R10 million)  | R13 million<br>(Target – R12 million) | R14.2 million  | R11.9 million  | R12 million   |         |
|   |                                       | M4.2.4 The total contract expenditure to the broad space related industry for core space projects | T4.2.4 The total contract expenditure of R275 million to the broad space related industry for core space projects <sup>1</sup> by March 2020 | R98.1 million<br>(Target – R50 million) | R77 million<br>(Target – R55 million) | R65 million  | R50 million  | R55 million   |         |
|   |                                       | M4.2.5 The progress status on the CubeSat Development   | T4.2.4 100% progress based on key defining milestones as per project lifecycle   | Target introduced in 2018/19            | Target introduced in 2018/19          | Target introduced in 2018/19                                       | Completion of the qualification and flight models, launch and commission     | -   |         |

| 2015/2020 Strategic Outcome Oriented Goals –Annual Targets |  |   |   | Audited Actual Performance   | Audited Actual Performance   | Estimated Performance        | Medium-Term Targets |         |         |
|--|--|---|---|------------------------------|------------------------------|------------------------------|---------------------|---------|---------|
| Strategic Goal   | Strategic Objective  | Key Performance Indicator/Measure                       | Strategic Plan Five-Year Target                               | 2015/16                      | 2016/17                      | 2017/18                      | 2018/19             | 2019/20 | 2020/21 |
|  |  |   | culminating in the CubeSat launch by March 2019               |                              |                              |                              |                     |         |         |
| <b>Goal 5: Develop active global partnerships</b>          | S5.1<br>Leverage a significant benefit for the space programme through global partnerships | M5.1.1<br>Number of active formal overseas partnerships | T5.1.1<br>6 active formal overseas partnerships by March 2020 | Target introduced in 2018/19 | Target introduced in 2018/19 | Target introduced in 2018/19 | 5                   | 6       |         |
|  |  | M5.1.2<br>Number of active formal African partnerships  | T5.1.2<br>6 active formal African partnerships by March 2020  | Target introduced in 2018/19 | Target introduced in 2018/19 | Target introduced in 2018/19 | 5                   | 6       |         |
|  |  | M5.1.3<br>Number of active formal national partnerships | T5.1.3<br>6 active formal national partnerships by March 2020 | Target introduced in 2018/19 | Target introduced in 2018/19 | Target introduced in 2018/19 | 5                   | 6       |         |

Note 1: This target is linked to the satellite development programme. Funding for the programme is not yet confirmed for the 2018 MTEF. As the satellite build programme is still work in progress, the related key performance indicators and targets are reflected with anticipation that funding will be provided for the MTEF.

## OVERVIEW OF 2018/19 BUDGET AND MEDIUM TERM EXPENDITURE ESTIMATES

### Sources of revenue

Table 5: Consolidated Revenue Estimates

| Rand                                       | Audited            | Audited            | Audited            | Revised            | Medium Term Expenditure Framework |                    |                    | Total MTEF         |
|--|--------------------|--------------------|--------------------|--------------------|-----------------------------------|--------------------|--------------------|--------------------|
|  | Outcomes           | Outcomes           | Outcomes           | Budget             | 2018/19                           | 2019/20            | 2020/21            |                    |
|  | 2014/15            | 2015/16            | 2016/17            | 2017/18            |                                   |                    |                    |                    |
| REVENUE                                    |                    |                    |                    |                    |                                   |                    |                    |                    |
| Revenue from Non - Exchange Transactions   | 162 998 661        | 232 440 718        | 246 306 405        | 253 494 690        | 144 907 500                       | 153 025 505        | 156 740 580        | 454 673 585        |
| Operational Transfers                      | 118 298 000        | 124 383 068        | 124 977 000        | 131 226 000        | 138 036 000                       | 145 453 000        | 153 453 000        | 436 942 000        |
| Parliamentary Grant                        | 118 298 000        | 124 383 068        | 124 977 000        | 131 226 000        | 138 036 000                       | 145 453 000        | 153 453 000        | 436 942 000        |
| Ring fenced Grants                         | 44 700 661         | 108 057 650        | 121 329 405        | 122 268 690        | 6 871 500                         | 7 572 505          | 3 287 580          | 17 731 585         |
| Principal/Agent Transfers                  | 17 750 534         | 34 225 427         | 8 258 803          | 9 268 569          | -                                 | -                  | -                  | -                  |
| Revenue from Exchange Transactions         | 76 113 342         | 110 397 274        | 98 522 471         | 81 127 460         | 76 656 596                        | 78 685 612         | 82 601 910         | 237 944 119        |
| Rendering of Services                      | 67 680 858         | 96 828 628         | 71 764 813         | 70 595 637         | 76 286 596                        | 78 307 212         | 82 214 522         | 236 808 331        |
| Contract Revenue - Public Sector           | 28 543 442         | 32 222 035         | 22 689 805         | 22 888 860         | 25 927 128                        | 26 762 786         | 27 647 711         | 80 337 626         |
| Contract Revenue - Private Sector          | 570 112            | 1 004 655          | 558 968            | 4 277 768          | 2 611 833                         | 2 735 205          | 2 864 000          | 8 211 037          |
| Contract Revenue - Foreign                 | 38 567 304         | 63 601 938         | 48 516 040         | 43 429 010         | 47 747 635                        | 48 809 221         | 51 702 812         | 148 259 668        |
| Other Income                               | 8 432 484          | 13 568 646         | 26 757 658         | 10 531 823         | 370 000                           | 378 400            | 387 388            | 1 135 788          |
| Interest Income                            | 5 579 081          | 8 394 521          | 9 578 634          | 5 984 813          | 250 000                           | 250 000            | 250 000            | 750 000            |
| Other Income                               | 668 054            | 5 174 125          | 17 179 024         | 3 917 879          | 120 000                           | 128 400            | 137 388            | 385 788            |
| Net Gains on Foreign exchange transactions | 2 185 350          | -                  | -                  | 629 131            | -                                 | -                  | -                  | -                  |
| Accumulated surplus                        | 57 471 398         | 16 672 766         | 8 483 375          | 46 958 834         | -                                 | -                  | -                  | -                  |
| <b>Total Revenue</b>                       | <b>314 333 935</b> | <b>393 736 185</b> | <b>361 571 054</b> | <b>390 849 554</b> | <b>221 564 096</b>                | <b>231 711 117</b> | <b>239 342 491</b> | <b>692 617 704</b> |

The projected total annual funding for SANSA is R222 million in 2018/19, R232 million in 2018/19 and R239 million in 2019/20 with a total of R693 million over the medium term. The decline in the annual projections from 2018/19 related to the additional satellite development programme funding not yet confirmed by the Department.

## Expenditure estimates

Table 6: Consolidated Expenditure Estimates

| Rand  | Audited            | Audited            | Audited            | Revised            | Medium Term Expenditure Framework |                    |                    | Total MTEF         |
|---|--------------------|--------------------|--------------------|--------------------|-----------------------------------|--------------------|--------------------|--------------------|
|   | Outcomes           | Outcomes           | Outcomes           | Budget             | 2018/19                           | 2019/20            | 2020/21            |                    |
|   | 2014/15            | 2015/16            | 2016/17            | 2017/18            |                                   |                    |                    |                    |
| <b>Expenditure</b>                                |                    |                    |                    |                    |                                   |                    |                    |                    |
| Employee Related Costs                            | 93 019 881         | 96 046 176         | 104 695 500        | 120 105 951        | 123 983 457                       | 130 928 719        | 138 087 663        | 392 999 840        |
| Board Member Remuneration                         | 650 119            | 914 270            | 1 069 887          | 1 023 830          | 877 200                           | 926 323            | 977 271            | 2 780 794          |
| Depreciation and Amortisation                     | 22 902 663         | 25 097 187         | 23 878 330         | -                  | -                                 | -                  | -                  | -                  |
| Repairs and Maintenance                           | 7 620 613          | 8 355 117          | 7 435 449          | 17 680 858         | 6 294 141                         | 7 562 428          | 7 836 075          | 21 692 644         |
| Finance Costs                                     | 49 680             | 10 202             | 24 339             | -                  | -                                 | -                  | -                  | -                  |
| Data Licence fees                                 | 26 729 023         | 31 406 738         | 36 124 088         | 61 779 570         | 24 199 000                        | 23 841 000         | 23 777 340         | 71 817 340         |
| Grants and Subsidies Paid                         | 19 671 537         | 24 928 952         | 5 452 793          | 8 320 057          | 7 179 920                         | 7 894 228          | 3 622 447          | 18 696 595         |
| Antenna Infrastructure Services                   | 1 102 997          | 4 146 811          | 203 266            | 2 971 575          | -                                 | -                  | -                  | -                  |
| Training Expenses                                 | 1 578 862          | 1 733 803          | 1 720 023          | 2 935 686          | 1 784 296                         | 1 842 146          | 1 902 594          | 5 529 037          |
| General Expenses                                  | 50 108 039         | 47 378 832         | 57 713 920         | 48 599 588         | 51 858 983                        | 53 805 575         | 57 053 153         | 162 717 711        |
| Net Losses on foreign exchange transactions       | 4 876              | 5 470 529          | 1 352 836          | 52 881             | -                                 | -                  | -                  | -                  |
| Loss on Disposal of Property, Plant and Equipment | 149 771            | 1 149 071          | 564 608            | 3 303              | -                                 | -                  | -                  | -                  |
| <b>Total Operating Expenditure</b>                | <b>223 588 061</b> | <b>246 637 688</b> | <b>240 235 040</b> | <b>263 473 298</b> | <b>216 176 996</b>                | <b>226 800 420</b> | <b>233 256 545</b> | <b>676 233 961</b> |
| <b>Principal/Agent Transfers</b>                  | <b>17 750 534</b>  | <b>34 225 427</b>  | <b>8 258 803</b>   | <b>9 268 569</b>   | -                                 | -                  | -                  | -                  |
| AIT facilities/Industry Upgrade/Incentives        | 17 750 534         | 34 225 427         | -                  | -                  | -                                 | -                  | -                  | -                  |
| Operation Phakisa - CPUT                          | -                  | -                  | 8 258 803          | 9 268 569          | -                                 | -                  | -                  | -                  |
| Other   | -                  | -                  | -                  | -                  | -                                 | -                  | -                  | -                  |
| <b>Surplus / (Deficit) for the year</b>           | <b>72 995 340</b>  | <b>112 873 070</b> | <b>113 077 211</b> | <b>118 107 687</b> | <b>5 387 100</b>                  | <b>4 910 697</b>   | <b>6 085 946</b>   | <b>16 383 743</b>  |
| <b>Capital Expenditure</b>                        | <b>72 995 340</b>  | <b>112 873 070</b> | <b>113 077 211</b> | <b>118 107 687</b> | <b>5 387 100</b>                  | <b>4 910 697</b>   | <b>6 085 946</b>   | <b>16 383 743</b>  |
| Buildings and other fixed structures              | -                  | -                  | -                  | 50 000             | -                                 | -                  | -                  | -                  |
| Machinery and equipment                           | 18 065 814         | 8 923 758          | 18 222 259         | 35 202 786         | 2 787 100                         | 3 810 697          | 4 785 946          | 11 383 743         |
| Computer Equipment                                | 345 265            | 3 548 908          | 984 615            | 6 555 157          | 2 000 000                         | 500 000            | 500 000            | 3 000 000          |
| Software and intangible assets                    | 14 747             | 6 180              | 14 959             | 5 174 553          | 600 000                           | -                  | -                  | 600 000            |
| Vehicles  | 174 900            | 541 062            | -                  | 300 000            | -                                 | 600 000            | 800 000            | 1 400 000          |
| AIT Facility                                      | -                  | -                  | -                  | 6 525 530          | -                                 | -                  | -                  | -                  |
| Satellite Development                             | 54 394 614         | 99 853 162         | 93 855 378         | 64 299 661         | -                                 | -                  | -                  | -                  |
| <b>Total Expenditure</b>                          | <b>314 333 935</b> | <b>393 736 185</b> | <b>361 571 054</b> | <b>390 849 554</b> | <b>221 564 096</b>                | <b>231 711 117</b> | <b>239 342 490</b> | <b>692 617 704</b> |

## Expenditure by economic classification

The Agency derives its revenue through transfers from the DST. The parliamentary grant is estimated to increase only by 5% over the medium term. Other sources of revenue include interest earned on investments, rendering services and other income. Contract revenue is thus expected to grow over the medium term by 3% as a result of a limited scope in terms of providing mandate work at a fee from state institutions, fixed term hosting contracts from international clients reaching their term end and the inability to project for launch support revenues as these are dependent on the success of the launches.

Compensation of employees remains one of the significant drivers of expenditure which amounts to 55% of the budget. This enables the Agency to source scientists, engineers and

researchers in the space science industry to support its mandate as well as the satellite build programme. The headcount on permanent staff will marginally increase from 190 in 2017/18 to 192 in 2019/20 in order to remain within budget.

Expenditure on goods and services contributes to 41% of the total budget, and noticeably decreases over the medium term. This is due to total transfers over the medium term decreasing by 17% coupled with a marginal increase of only 5% on contract revenue. Due to current budget constraints, personnel costs can only increase by the CPI at an average growth rate of 3.8% over the medium term and goods and services decline by 8% over the medium term. The impact of the decrease will affect the institution's ability to source satellite imagery which is largely from international suppliers and a fundamental deliverable in terms of the SANSA mandate, to effectively operate SANSA's facilities and maintain infrastructure operational, and will also result in the ceasing of the satellite build programme.

Payments for capital assets constitute 4% of the total budget over the medium term. The satellite programme funding is not yet confirmed for the medium term, hence the substantial reduction in projections. This will have an impact on the completion and commissioning of the satellite.

## ENTERPRISE RISK MANAGEMENT PERIOD 2018/19

**Enterprise Risk Management (ERM)** is now established within the organisation and is applied across the organisation in line with the Board's approved ERM Policy and Framework. The SANSA ERM plan and strategic risk register are reviewed and approved annually by the Board, to ensure alignment with the strategic goals of SANSA. ERM awareness is also conducted to promote a risk management culture throughout SANSA.

ERM has also implemented necessary policies, prevention plans and awareness sessions to assist the organisation to counter fraud and corruption.

The table below highlights the identified risks and some of the associated control measures as per the SANSA Strategic Risk Register:

|   | SANSA Goals       | Risk Description   | Consequences of Risk   | Inherent Risk |            |        | Current Controls   |
|---|-------------------|--|--|---------------|------------|--------|--|
|   |                   |  |  | Impact        | Likelihood | Rating |  |
| 1 | Goals 4 &5        | Inability to execute and deliver on the objectives; i.e. EO-Sat 1 Satellite program and Industry Development | 1. Inadequate Satellite program<br>2. No Competitive Space Industry<br>3. Unable to develop the required human capital to capacitate the space programme<br>4. Unable to develop required technologies to give SA Space Industry the global competitive edge<br>5. Extended delays to the satellite program<br>6. Financial losses | 5             | 5          | 25     | 1. Continuous Engagement with the Department of Science and Technology (DST) for increased funding<br>2. Industry Development and Localisation Policy in place to guide in developing the industry<br>3. National Space Strategy in place<br>4. User Specification requirements have been developed and discussed with the contactors<br>5. Life Cycle Costing estimation completed and approved by the Board<br>6. Managing the Industry Development process and localisation through the EO-Sat1 contract<br>7. SANSA to complete an analysis on the absolute minimum cost for the acquisition of the EO-Sat1 system to be presented to the DST<br>8. Prepare the annual programme plan which will indicate to DST the resource challenges for the next financial year |
| 2 | Goals 1, 2,3,4, 5 | Failure to reach the 80% minimal threshold of SANSA annual performance targets                               | 1. Failure to meet shareholders compact as agreed with the Minister<br>2. Inability to demonstrate impact and shareholder's return<br>3. Loss of public value and return<br>4. Loss of credibility as a key player in the space industry<br>5. Loss of funding<br>6. Financial unsustainability                                    | 5             | 3          | 15     | 1. Ongoing engagement with key stakeholders regarding funding, i.e. Department of Science and Technology (DST)<br>2. Communication and roll-out of the strategy and the annual performance plan. (Annually)<br>3. Quarterly reporting on performance<br>4. Finalise and submit the Financial Sustainability Framework and Strategy for SANSA to the Board for approval   |



|   | SANSA Goals     | Risk Description                                 | Consequences of Risk  | Inherent Risk |            |        | Current Controls  |
|---|-----------------|--|---|---------------|------------|--------|---|
|   |                 |  |   | Impact        | Likelihood | Rating |   |
| 3 | Goals 1, 2, 4,5 | Inability to maintain and replace infrastructure | <ol style="list-style-type: none"> <li>1. Loss of income</li> <li>2. Loss of credibility (reputational risk)</li> <li>3. Failures to fulfil the SANSA mandate</li> <li>4. Increase replacement and replacement costs</li> <li>5. Repudiated claims</li> </ol> | 5             | 3          | 15     | <ol style="list-style-type: none"> <li>1. Insurance in place for infrastructure</li> <li>2. Good maintenance practice and plan in place</li> <li>3.Redundancy plan documented and implemented ( System Architecture Risk Assessment)</li> <li>4. The Computerised Maintenance Management System (CMMS)</li> <li>5. Funding challenges escalated to EXCO</li> <li>6. There is a process in place to notify clients of any downgraded services</li> </ol> |

## Part B: Programme Performance Plans

### PROGRAMME 1: ADMINISTRATION PROGRAMME (AP)

#### Purpose

The Administration Programme provides management, administrative and technical support at an Enterprise level across the organisation. This facilitates operational efficiency and cost-effective management, alignment with sound governance principles and the seamless integration and collaboration within the organisation.

#### Annual Priorities

##### The National Space Programme Activities

The National Space Programme activities will be monitored through reports generated quarterly by the respective SANSA divisions. The NSP is not fully funded hence the NSP has been removed as a target as the organisation cannot guarantee its performance. The EO-Sat1 and the Operations Phakisa project can be classified as part of the NSP. Until these programmes are fully-funded, SANSA has taken a decision not to report the NSP as a target. It is recognised that not all the projects under the NSP will be initiated at once and so the monitoring will be at the level of assessing if there is ongoing activity in each of the projects. This effort will also strengthen the programme coordination efforts of SANSA.

##### Financial Sustainability

To ensure the Agency's mandate is efficiently and effectively executed, a strong focus on new business development, effective engagement with key stakeholders, and the impactful communication and promotion of SANSA's activities, are necessary. Such initiatives will help foster favourable support for the SANSA brand as well as increase the Agency's brand value. The initiatives will also contribute positively towards the revenue growth of the Agency.

##### To move SANSA towards sustainability the following will be undertaken:

- A streamlined stakeholder engagement strategy will be developed and implemented; and
- A communications protocol including policies and processes aligned to the organisation's communication strategy will be developed.
- Revenue enhancement strategies through new business development initiatives
- Cost recovery mechanism for value added services provided, and
- Asset infrastructure investment and monitoring to ensure continued provision of value added services

##### High performance culture

The achievements of the SANSA objectives require a high-performance organisation that is characterised by transformational leadership, sound human resource management, inclusive working environment culture, and operational and technological efficiency and effectiveness.

##### To ensure that SANSA is optimised for high performance, the following will be undertaken:

- Driving a high-performance culture through sound leadership, client / customer focus, stakeholder management and partnering, best practice business processes, and "living" the organisational values;
- Rolling out the new performance management and development system;
- Developing a workforce plan that demonstrates the skills requirements for the SANSA strategic framework;
- Building Management capability and skills;

- Optimising SANSA's business processes to ensure a continuous smooth workflow across units;
- Implementation of a new ICT strategy;
- Legal services are delivered in accordance with service standards contained in the legal standards and procedural manual; and
- Effective and efficient compliance function that contributes to improved corporate governance.

## Reconciling performance targets with the Budget and MTEF

### Administration Programme - Revenue Estimates

Table 2: Administration - Revenue projections

| Administration                             | Audited           | Audited           | Audited           | Approved          | Revised           | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|  | Outcomes          | Outcomes          | Outcomes          | Budget            | Budget            | 2018/19                           | 2019/20           | 2020/21           |                    |
|  | 2014/15           | 2015/16           | 2016/17           | 2017 / 2018       | 2017/18           |                                   |                   |                   |                    |
| <b>REVENUE</b>                             |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Revenue from Non - Exchange Transactions   | 37 662 523        | 46 868 202        | 44 028 103        | 42 996 256        | 48 967 953        | 44 560 548                        | 47 332 067        | 45 550 249        | 137 442 864        |
| <b>Operational Transfers</b>               |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Parliamentary Grant                        | 36 911 523        | 45 596 001        | 40 168 000        | 42 996 256        | 42 996 256        | 40 560 548                        | 42 832 067        | 45 550 249        | 128 942 864        |
| <b>Ring fenced Grants</b>                  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Post graduate student bursary support -NRF | 751 000           | 1 272 201         | 3 860 103         | -                 | 5 971 696         | 4 000 000                         | 4 500 000         | -                 | 8 500 000          |
| Post graduate student bursary support -DST | 751 000           | 1 272 201         | 3 860 103         | -                 | 5 971 696         | 4 000 000                         | 4 500 000         | -                 | 8 500 000          |
| <b>Revenue from Exchange Transactions</b>  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Other Income                               | 4 720 483         | 5 454 665         | 9 865 128         | -                 | 5 083 750         | -                                 | -                 | -                 | -                  |
| Interest Income                            | 4 435 977         | 5 435 177         | 8 165 802         | -                 | 5 083 750         | -                                 | -                 | -                 | -                  |
| Other Income                               | 284 506           | 19 489            | 1 699 326         | -                 | -                 | -                                 | -                 | -                 | -                  |
| Accumulated surplus roll over              |                   |                   |                   |                   | 6 540 644         |                                   |                   |                   |                    |
| <b>Total Revenue</b>                       | <b>42 383 006</b> | <b>52 322 867</b> | <b>53 893 231</b> | <b>42 996 256</b> | <b>60 592 346</b> | <b>44 560 548</b>                 | <b>47 332 067</b> | <b>45 550 249</b> | <b>137 442 864</b> |

## Administration programme - Expenditure estimates

Table 2: Administration - Expenditure projections

| Administration                                    | Audited           | Audited           | Audited           | Approved          | Revised           | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|   | Outcomes          | Outcomes          | Outcomes          | Budget            | Budget            | 2018/19                           | 2019/20           | 2020/21           |                    |
|   | 2014/15           | 2015/16           | 2016/17           | 2017 / 2018       | 2017/18           |                                   |                   |                   |                    |
| <b>Expenditure</b>                                |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Employee Related Costs                            | 24 573 256        | 21 206 319        | 27 077 308        | 29 944 000        | 29 208 355        | 29 682 344                        | 31 344 555        | 33 068 506        | 94 095 405         |
| Board Member Remuneration                         | 650 119           | 914 270           | 1 069 887         | 1 023 830         | 1 023 830         | 877 200                           | 926 323           | 977 271           | 2 780 794          |
| Depreciation and Amortisation                     | 2 554 950         | 2 417 048         | 1 362 128         |                   | -                 | -                                 | -                 | -                 | -                  |
| Repairs and Maintenance                           | 2 510 968         | 352 187           | 274 944           | 127 267           | 308 071           | 358 583                           | 378 664           | 399 490           | 1 136 737          |
| Finance Costs                                     | 29 608            | 10 125            | 24 339            |                   | -                 | -                                 | -                 | -                 | -                  |
| Data Licence fees                                 |                   | -                 | -                 |                   | -                 | -                                 | -                 | -                 | -                  |
| Grants and Subsidies Paid                         |                   | 1 161 500         | 927 500           |                   | 5 971 696         | 4 000 000                         | 4 500 000         | -                 | 8 500 000          |
| Antenna Infrastructure Services                   |                   | -                 | -                 |                   | -                 | -                                 | -                 | -                 | -                  |
| Training Expenses                                 | 484 497           | 604 532           | 982 267           | 500 000           | 620 132           | 436 446                           | 460 887           | 486 236           | 1 383 568          |
| General Expenses                                  | 14 095 370        | 12 340 120        | 15 873 702        | 10 145 265        | 17 019 265        | 8 755 975                         | 9 271 638         | 10 218 746        | 28 246 360         |
| Net Losses on foreign exchange transactions       | 4 876             | 49 839            | 154 563           | -                 | -                 | -                                 | -                 | -                 | -                  |
| Loss on Disposal of Property, Plant and Equipment | 19 497            | -                 | 36 306            | -                 | -                 | -                                 | -                 | -                 | -                  |
| <b>Total Operating Expenditure</b>                | <b>44 923 140</b> | <b>39 055 939</b> | <b>47 782 945</b> | <b>41 740 361</b> | <b>54 151 349</b> | <b>44 110 548</b>                 | <b>46 882 067</b> | <b>45 150 249</b> | <b>136 142 864</b> |
| <b>Surplus / (Deficit) for the year</b>           | <b>-2 540 135</b> | <b>13 266 928</b> | <b>6 110 285</b>  | <b>1 255 895</b>  | <b>6 440 997</b>  | <b>450 000</b>                    | <b>450 000</b>    | <b>400 000</b>    | <b>1 300 000</b>   |
| <b>Capital Expenditure</b>                        | <b>-</b>          | <b>-</b>          | <b>-</b>          | <b>1 255 895</b>  | <b>6 440 997</b>  | <b>450 000</b>                    | <b>450 000</b>    | <b>400 000</b>    | <b>1 300 000</b>   |
| Buildings and other fixed structures              |                   |                   |                   | -                 | 50 000            |                                   |                   |                   | -                  |
| Machinery and equipment                           |                   |                   |                   |                   | -                 | 450 000                           | 450 000           | 400 000           | 1 300 000          |
| Computer Equipment                                |                   |                   |                   |                   | 1 246 892         |                                   |                   |                   | -                  |
| Software and intangible assets                    |                   |                   |                   | 1 255 895         | 5 144 106         |                                   |                   |                   | -                  |
| <b>Total Expenditure</b>                          | <b>44 923 140</b> | <b>39 055 939</b> | <b>47 782 945</b> | <b>42 996 256</b> | <b>60 592 346</b> | <b>44 560 548</b>                 | <b>47 332 067</b> | <b>45 550 249</b> | <b>137 442 864</b> |
| <b>Budget Surplus/Deficit</b>                     | <b>-2 540 135</b> | <b>13 266 928</b> | <b>6 110 285</b>  | <b>-</b>          | <b>-</b>          | <b>-</b>                          | <b>-</b>          | <b>-</b>          | <b>-</b>           |

## PROGRAMME 2: EARTH OBSERVATION PROGRAMME (EOP)

### Purpose

The Earth Observation Programme (EOP) leads, enables and coordinates the development and promotion of Earth observations products for socio-economic development and environmental management in South Africa, the African continent and globally. The Programme's main core function is the implementation of the South African Earth Observation Strategy (SAEOS). This is achieved through maintenance of an up to date long-term archive of satellite data, provision of adequate data handling infrastructure and efficient distribution systems, informs satellite mission planning, provision of Earth observations value-added products to government entities, research councils and education institutions working with natural resources, disaster management, urban development, health and safety and security sectors towards the achievement of the set national and global sustainable development goals. In addition, EOP contributes to science engagement and advancement, human capital development and facilitates industry development in particular through building and connecting the EO community locally and abroad through SA-GEO, AfriGEOSS, Committee of African Space Institutions (CASI), Group on Earth Observations (GEO) and Committee on Earth Observation Satellites (CEOS).

### Strategic Focus

Goal 1: Address South Africa's challenges through space services and products

- Fit for purpose data archive through a relevant sensor portfolio and data products
- National land use and land cover base datasets

Goal 2: Lead high-impact collaborative R&D on a national scale

- Remote sensing research
- Industry development
- Development and servicing of national, regional and international partnerships

Goal 3: Develop national human capacity and ensure transformation

- Science outreach and awareness
- Student funding and intern training
- Education (Fundisa) resources
- University support

Goal 4: Enhance the competitiveness of the South African space industry

- Earth Observation Data Centre (EODC) a data management and distribution system

### Strategic Goal 1: Address South Africa's challenges through space services and products

#### Sensor Portfolio and Data Products

The acquisition, archiving and dissemination of satellite datasets is a core function of the Earth Observation Programme. Satellite datasets are a critical input in stimulating innovation and the development of value added products and services within the entire EO landscape across the African continent. SANSA acquires satellite data from many international satellite vendors for national use. These include Landsat 7 and 8, SPOT 6 and 7, MODIS and CBERS-4. The centralised acquisition under a single-license multi-user arrangement, as is the case with SPOT 6 and 7, eradicates costly and multiple acquisitions of the same datasets by the public sector and ensures the long-term archiving of the valuable data stock. An estimated 40 government entities, on both the national and provincial level, use these data resources. SANSA has also negotiated favourable licensing to allow for discounted access to this data to

the South African private sector and the Southern African Development Community (SADC) region.

To meet the wide user demands, SANSA anticipates widening its sensor portfolio to increase its range of satellite data products to improve the diversity of its offerings at various spatial, spectral and temporal resolutions. The GEO Open Data Sharing Principles have significantly increased the range of open and free datasets that SANSA will archive and distribute at no cost to users in South Africa and the Southern African community. The inclusion of the open access Sentinel data into the SANSA sensor portfolio will be further explored, looking at interim measures, whilst awaiting the agreement between the European Commission and the African Union.

The recently signed BRICS virtual constellation partnership will further unlock potential additional datasets into the sensor portfolio such as Superview, Kanopus-V1, Resourcesat-2, GF-1 and ZY-3/02 in addition to the CBERS-4 data that is already being directly received.

SANSA will play a critical role in supporting Operation Phakisa: The Oceans Economy initiative through the direct reception and provision of Synthetic Aperture Radar (SAR) data. The SAR data will be used for ship surveillance, water pollution detection and monitoring of fishing activities. SANSA will avail its sensor portfolio and research capability to support maritime spatial planning and coastal infrastructure mapping.

#### **National Land Use and Land Cover Base Datasets**

The development of national base datasets such as biophysical variables, water bodies, human settlements, vegetation layers and satellite mosaics is critical in supporting the Earth observation community with fundamental environmental parameters for further manipulation and transformation. Base datasets will provide scientists and industry professionals with the opportunity to develop specific value-added products and services to meet dedicated user needs. The aim is to focus on key base layers that fulfil multiple user needs such as water, vegetation and human settlements. SANSA's new strategic goals are intended to be responsive to the user needs in EO and have been tailored to bridge the gap in the provision of essential public good national base products. SANSA scientists will focus on the development of essential base products and services that is needed by the end-users and by public and private sector entities for use in their respective products and services. The development and distribution of these base products and services will provide an enabling environment for other entities to further pursue business and development opportunities; thus meeting SANSA's mandate of developing the local space industry. In 2018/19 the focus will be on:

- (a) **Biophysical parameters:** Primary focus will be on generating quarterly composites of vegetation biophysical variables that are indicative of vegetation stress, chlorophyll content and general health condition at a national scale. Typical variables that will be generated include Leaf Area Indices, Normalised Vegetation Indices, and Fraction of Absorbed Photosynthetically Active Radiation. These biophysical parameters are critical in monitoring crops, rangelands and ecosystem health. Target users include the Department of Agriculture Forestry and Fisheries, Department of Water and Sanitation, Department of Environmental Affairs and agricultural companies and associations.
- (b) **National Human Settlement Layer:** The key focus on the generation of the human settlements layer will be extending on improving the existing automated algorithms for mapping built-up areas and expanding the user base. Primary users of the human settlement layer include the Department of Human Settlements, Gauteng Provincial Government, Limpopo Provincial Government, Municipal Demarcation Board, Housing Development Agency, Statistics South Africa, Eskom, Department of Environmental Affairs, municipalities, Department of Agriculture, Forestry and Fisheries and the Department of Water Affairs and Sanitation.

- (c) **National Water Layer:** The water layer is proving to be a fundamental dataset for inventory of small water bodies for water licencing. The focus will be on supporting the Department of Water Affairs and Sanitation, Randwater, Water Research Commission, Department of Environmental Affairs and the Department of Agriculture, Forestry and Fisheries with water information products. Two national water layers will be produced annually using automated mapping techniques. Water body maps will incorporate an inventory of all water bodies including dams, in the country to ensure compliance with the Water Act and for water licencing purposes. Dedicated attention will also be provided to water quality mapping, particularly to eutrophication in major dams.
- (d) **Disaster Management Maps:** In response to environmental related disaster events that occur frequently in the Southern African region, SANSA will support the provincial and National Disaster Management Centres in the SADC region with reference datasets for disaster management such as flood and drought maps in the affected areas. Our Disaster and Risk Management Response competency will be strengthened through collaborations with other space agencies in the CEOS Working Group on Disasters.

## Strategic Goal 2: Lead high-impact collaborative R&D on a national scale

### Remote sensing research

Cutting edge applied research and development will remain fundamental in driving the innovation process for product development. This will be achieved through algorithm development automation for data acquisition, image processing and information extraction from satellite imagery. Collaborative research partnerships will be forged and maintained with national and international institutions to develop new products and services. Key thematic areas that will be addressed include food security, water, vegetation, human settlements and disaster management.

The collection and consolidation of user requirements is a critical element in addressing the wide range of customer requirements. SANSA will use platforms such as the communities of practices in SA-GEO, AfriGEOSS and other platforms in Africa, together with survey tools, to collect user requirements. The development of value added products and services will thus be responsive to the needs of stakeholders in all the three spheres of government (national, provincial and local) and public entities.

Research in 2018/19 will also be centred on satellite mission development with a primary focus on the ground segment development of EO-SAT1 and the related calibration and validation work.

### Industry development

To stimulate innovation in South Africa, SANSA, in partnership with the Innovation Hub Company's Open Innovation Exchange (a Gauteng Government funded entity) and commercial Earth observation imagery providers, will collaborate to run an innovation challenge aimed at encouraging the development of novel applications using EO data. The objective of the challenge, in the first instance, is to stimulate the innovative development of EO applications to provide a knowledge base for evidenced based environmental and socio-economic decision making and reporting in government. An example of the latter is the use of EO to support country level reporting for progress on the United Nation's Sustainable Development Goal areas of agriculture, environmental monitoring, water management, marine management, and sustainable cities. In the second instance, the objective would be to stimulate and encourage the development of such applications by South African small, medium and micro enterprises. The open innovation challenge will therefore ensure high level of engagement with participating companies and facilitation of interactions with decision makers.



### **Development and servicing of national, regional and international partnerships**

The EOP will proactively collaborate with national and international partners across the EO value chain to deliver on its strategic goals and improve the range and quality of its product and service. Partnerships will be actively pursued to increase the agency's impact in research and development, data supply, human capital development and stimulation of the space industry. Joint proposals will be exploited as a means of soliciting funding to drive the innovative development of products and services. At a national level SANSa will partner and collaborate with institutions in the national system of innovation such as research councils, universities and user entities in the private and public sector. The new strategic focus on Africa provides SANSa with an opportunity to strengthen its collaborations through partnerships with African institutions such as NEPAD and the African Union Commission. Space agency / institute to space agency collaborations will be strengthened through leadership on the Committee of African Space Institutes (CASI), ARMC and participation in CEOS and the BRICS Constellation Partnership. In addition, SANSa will play a greater role in co-ordinating national EO efforts through SA-GEO for a greater and more influential participation in AfriGEOSS and GEO.

## **Strategic Goal 3: Develop national human capacity and ensure transformation**

### **Human Capital Development**

To achieve a vibrant human capital development programme that builds on existing capability, a multi-pronged approach that includes funding of postgraduate students, short training courses, guest lecturing at universities, student co-supervision, internships and studentship programmes will be applied. Students from previously disadvantaged backgrounds are targeted in all the training and funding interventions. The agency aims to provide advanced theoretical content and practical skills in remote sensing to university students and professionals in the public and private sector. Advanced short training courses will be provided through SANSa's partnership with JICA and CEOS Working Group on Capacity Building. Satellite datasets, open source software, reading materials and other geospatial datasets will be distributed to university through the Fundisa Disc. The Fundisa online web portal will provide various remote sensing learning materials and tools to university students.

### **Science Advancement**

The Science Advancement services will be implemented within the context of the DST's Science Engagement Strategy and the national space awareness programme with the purpose to stimulate space science and technology interest in the public and demonstrate the value Science, Technology, Engineering, Mathematics and Innovation (STEMI) plays in society. The target audience to be engaged is aligned with the 11 identified segments of the public in the DST Science Engagement Strategy intended to improve the coordination of and encourage science promotion, communication and engagement activities across the Department, its entities, universities, other government departments and science councils, museums and partners outside the public sector. The science advancement programme is implemented in partnership with industry partners such as NRF SAASTA that play the coordinating role in the system and through whom external funding is sourced on specific projects. Other stakeholders, such as the Department of Basic Education, share common objectives including improved learner performance in Mathematics and Physical Science while the network of science centres distributed nationwide is a strategic partner in outreach and awareness activities. To leverage on the multiplier effects of the train the trainer model, Geography educators in schools will be empowered with practical skills in GIS and remote sensing to enable them to effectively teach the grades 10 – 12 curricula. The Fundisa Disk School Edition learning resources will be provided to schools countrywide.

## **Strategic Goal 4: Enhance the competitiveness of the South African space industry**

### **Earth Observation Data Centre**

The collection, storage, archiving, processing and dissemination of satellite imagery, together with the development of fundamental data sets and the coordination of the development of value added products and services through the National System of Innovation (NSI) are at the core of the Earth Observation Programme function through the coordination of the provision of EO products and services. The development of geospatial products and services is reliant on the availability of satellite data and IT infrastructure. SANSA seeks to:

- increase the ease of access to the national geospatial decision support data products and services;
- develop new processing tools to enhance the user experience and benefit;
- improve the quality of the data products and services; and
- improve the turnaround delivery times.

The building of core space infrastructure, both ground and space based, will enable the delivery of essential space services. In order to 1) provide the appropriate infrastructure, such as data cubes, for the South African EO community to run big data applications in a number of societal benefit areas; 2) further leverage national large scale big data infrastructure such as those being established by the Square Kilometre Array Telescope, The High Performance Computing Centre and the Data Intensive Research Cloud Initiative; and 3) contribute to continental initiatives through the AfriGEOSS and the implementation of the African Space Strategy, SANSA will be establishing a node in the African Research Cloud prototype (ARC prototype). The ARC prototype is a multi-institutional, multi-disciplinary initiative involving universities and research councils to establish a distributed cloud infrastructure across South Africa. The ARC prototype will be expanded into a continental infrastructure called the African Data Intensive Research Cloud ADIRC. Three application areas are planned namely, Astronomy, Bioinformatics and Earth observation. SANSA will be the Earth observation node for ARC prototype and will contribute to the network of EO nodes in the ADIRC. In both cases SANSA will leverage capacities and capabilities of other EO institutions in the country and ensure appropriate connectivity with the SAEOS Portal.

## Programme Performance Indicators and Quarterly Targets - 2018/19

### EARTH OBSERVATION PROGRAMME

| Earth Observation Programme   |   |   |  | Quarterly Targets  |  |   |   |
|---|---|---|--|--|--|---|---|
| Strategic Goal  | Strategic Objective   | Key Performance Indicator/Measure   | Annual Target  | Q1   | Q2   | Q3  | Q4  |
| Goal 1: Address South Africa's challenges through space products and services             | S1.1 Lead and facilitate the creation of high-impact applications to address society's needs and challenges | M1.1 The number of national high-impact applications                      | 1. 50 000 images distributed                           | 10 000   | 10 000   | 15 000  | 15 000  |
|   |   |   | 2. Five thematic categories for national base datasets | Implementation plan for production of national base datasets | 50% development of identified national base datasets | 80 % development of identified national base datasets | 100% development of identified national base datasets |
| Goal 2: Lead high-impact collaborative R&D on a national scale                            | S2.1 Increase the national space research output  | M2.1 The national research productivity score for space supported R&D     | 300  | -  | 150  | -   | 150   |
| Goal 3: The generation of space relevant knowledge that supports the developmental agenda | S3.1 Increase youth awareness of science  | M3.1 The number of youth directly engaged                                 | 5400   | 1500   | 2000   | 600   | 1300  |
|   | S3.2 Support students and interns   | M3.2 The number of students and interns supported for formalised training | 15   | 15   | -  | -   | -   |
| Goal 4: Enhance the competitiveness of the South African space industry                   | S4.2 Grow the national space industry   | M4.2.3 Total contract expenditure to SMEs for core space projects         | R1.9 million   | 1.9 million  | -  | -   | -   |
| Goal 5: Develop active global partnerships  | S5.1 Leverage a significant benefit for the space programme through global partnerships                     | M5.1.1 Number of active overseas partnerships                             | 2  | 1  | 0  | 1   | 0   |
|   |   | M5.1.2 Number of active African partnerships                              | 2  | 1  | 0  | 1   | 0   |
|   |   | M5.1.3 Number of active national partnerships                             | 2  | 1  | 0  | 1   | 0   |

## Reconciling performance targets with the Budget and MTEF

### Earth Observation Programme - Revenue Estimates

Table 11: Earth Observation Programme - Revenue Estimates

| Rand                                       | Audited Outcomes  | Audited Outcomes  | Audited Outcomes  | Revised Budget    | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|--|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|  | 2014/15           | 2015/16           | 2016/17           | 2017/18           | 2018/19                           | 2019/20           | 2020/21           |                    |
| <b>REVENUE</b>                             |                   |                   |                   |                   |                                   |                   |                   |                    |
| Revenue from Non - Exchange Transactions   | 44 521 477        | 47 064 068        | 60 981 000        | 49 542 133        | 48 540 706                        | 50 945 842        | 53 747 948        | 153 234 496        |
| Operational Transfers                      | 44 521 477        | 47 064 068        | 60 981 000        | 49 442 133        | 48 540 706                        | 50 945 842        | 53 747 948        | 153 234 496        |
| Parliamentary Grant                        | 44 521 477        | 47 064 068        | 60 981 000        | 49 442 133        | 48 540 706                        | 50 945 842        | 53 747 948        | 153 234 496        |
| Ring fenced Grants                         | -                 | -                 | -                 | 100 000           | -                                 | -                 | -                 | -                  |
| Research Grants                            | -                 | -                 | -                 | 100 000           | -                                 | -                 | -                 | -                  |
|  | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| <b>Revenue from Exchange Transactions</b>  | <b>19 075 624</b> | <b>21 073 259</b> | <b>11 296 129</b> | <b>14 075 473</b> | <b>18 736 000</b>                 | <b>16 736 000</b> | <b>15 736 000</b> | <b>51 208 000</b>  |
| Rendering of Services                      | 16 599 724        | 20 320 424        | 10 304 616        | 10 375 473        | 18 486 000                        | 16 486 000        | 15 486 000        | 50 458 000         |
| Contract Revenue - Public Sector           | 16 599 724        | 20 320 424        | 10 304 616        | 9 985 973         | 12 986 000                        | 12 986 000        | 12 986 000        | 38 958 000         |
| Contract Revenue - Private Sector          | -                 | -                 | -                 | 74 500            | 500 000                           | 500 000           | 500 000           | 1 500 000          |
| Contract Revenue - Foreign                 | -                 | -                 | -                 | 315 000           | 5 000 000                         | 3 000 000         | 2 000 000         | 10 000 000         |
| Other Income                               | 2 475 900         | 752 835           | 991 513           | 3 700 000         | 250 000                           | 250 000           | 250 000           | 750 000            |
| Interest Income                            | 108 477           | 726 328           | 815 722           | -                 | 250 000                           | 250 000           | 250 000           | 750 000            |
| Other Income                               | 16 363            | 26 507            | 175 791           | 3 700 000         |                                   |                   |                   | -                  |
| Net Gains on Foreign exchange transactions | 2 351 060         | -                 | -                 | -                 |                                   |                   |                   | -                  |
| Accumulated surplus                        | 2 762 567         | 17 360 969        | 17 375 137        | -                 | -                                 | -                 | -                 | -                  |
| <b>Total Revenue</b>                       | <b>66 359 668</b> | <b>85 498 296</b> | <b>89 652 266</b> | <b>63 617 605</b> | <b>67 276 706</b>                 | <b>67 681 842</b> | <b>69 483 948</b> | <b>204 442 496</b> |

The Earth Observation programme has an allocation of R204 million over the medium term, with annual expenditure required of R67 million in 2018/19, R68 million in 2019/20 and R69 million in 2020/21. The major expense allocation is in goods and services attributed to the acquisition, distribution and storage of satellite imagery for national geo-spatial information.

## Earth Observation Programme - Expenditure Estimates

Table 12: Earth Observation Programme - Expenditure Estimates

| Rand   | Audited           | Audited           | Audited           | Revised           | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|--|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|  | Outcomes          | Outcomes          | Outcomes          | Budget            | 2018/19                           | 2019/20           | 2020/21           |                    |
|  | 2014/15           | 2015/16           | 2016/17           | 2017/18           |                                   |                   |                   |                    |
| <b>Expenditure</b>                           |                   |                   |                   |                   |                                   |                   |                   |                    |
| Employee Related Costs                       | 20 568 855        | 21 594 546        | 23 337 493        | 24 138 000        | 25 345 761                        | 26 765 124        | 28 237 206        | 80 348 090         |
| Board Member Remuneration                    | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Depreciation and Amortisation                | 6 610 512         | 8 567 055         | 8 357 660         | -                 | -                                 | -                 | -                 | -                  |
| Repairs and Maintenance                      | 2 050 817         | 2 940 145         | 2 473 603         | 600 500           | 1 000 000                         | 2 000 000         | 2 200 000         | 5 200 000          |
| Finance Costs                                | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Data Licence fees                            | 26 723 548        | 31 406 738        | 36 124 088        | 35 187 570        | 24 199 000                        | 23 841 000        | 23 777 340        | 71 817 340         |
| Grants and Subsidies Paid                    | 202 642           | 258 396           | 1 445 100         | -                 | -                                 | -                 | -                 | -                  |
| Antenna Infrastructure Services              | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Training Expenses                            | 53 744            | 374 216           | 319 919           | 800 000           | 800 000                           | 800 000           | 800 000           | 2 400 000          |
| General Expenses                             | 10 149 550        | 12 208 877        | 17 353 807        | 1 041 535         | 13 331 945                        | 13 175 718        | 13 169 402        | 39 677 065         |
| Net Losses on foreign exchange transactions  | -                 | 5 274 975         | -6 767            | -                 | -                                 | -                 | -                 | -                  |
| Loss on Disposal of Property, Plant and Equi | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| <b>Total Operating Expenditure</b>           | <b>66 359 668</b> | <b>82 624 948</b> | <b>89 404 903</b> | <b>61 767 605</b> | <b>64 676 706</b>                 | <b>66 581 842</b> | <b>68 183 948</b> | <b>199 442 495</b> |
|  |                   |                   |                   |                   |                                   |                   |                   |                    |
|  |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Surplus / (Deficit) for the year</b>      | <b>-</b>          | <b>2 873 348</b>  | <b>247 363</b>    | <b>1 850 000</b>  | <b>2 600 000</b>                  | <b>1 100 000</b>  | <b>1 300 000</b>  | <b>5 000 000</b>   |
|  |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Capital Expenditure</b>                   | <b>-</b>          | <b>2 873 348</b>  | <b>247 363</b>    | <b>1 850 000</b>  | <b>2 600 000</b>                  | <b>1 100 000</b>  | <b>1 300 000</b>  | <b>5 000 000</b>   |
| Buildings and other fixed structures         | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Machinery and equipment                      | -                 | 2 873 348         | 247 363           | -                 | -                                 | -                 | -                 | -                  |
| Computer Equipment                           | -                 | -                 | -                 | 1 850 000         | 2 000 000                         | 500 000           | 500 000           | 3 000 000          |
| Software and intangible assets               | -                 | -                 | -                 | -                 | 600 000                           | -                 | -                 | 600 000            |
| Vehicles                                     | -                 | -                 | -                 | -                 | -                                 | 600 000           | 800 000           | 1 400 000          |
|  |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Total Expenditure</b>                     | <b>66 359 668</b> | <b>85 498 296</b> | <b>89 652 266</b> | <b>63 617 605</b> | <b>67 276 706</b>                 | <b>67 681 842</b> | <b>69 483 948</b> | <b>204 442 495</b> |

## PROGRAMME 3: SPACE SCIENCE PROGRAMME (SSP)

### Purpose

The Space Science Programme leads multi-disciplinary space science research and development. Key functions include, fundamental and applied space science research, the support of space-facilitated science through science data acquisition, coordination and management of scientific data ground segments, provision of space weather and other geo-space and magnetic technology products and services on a commercial and private basis to the defence, maritime, communications, aviation and energy sectors. The programme also provides leadership in post-graduate science and engineering student training as well as science advancement including both learner and educator science support.

### Strategic Focus

Goal 1: Address South Africa's challenges through space services and products

- Space weather services for satellite systems, electric power networks, satellite-based navigation, communication, defence, and aviation applications
- Geomagnetic services
- Magnetic technology services for defence, maritime and aviation sectors

Goal 2: Lead high-impact collaborative R&D on a national scale

- Space science research
- Development and servicing of national, regional and international partnerships
- Joint projects with external partners

Goal 3: Develop national human capacity and ensure transformation

- Science outreach and awareness
- Student and intern training
- Student funding
- University support

Goal 4: Enhance the competitiveness of the South African space industry

- Geo-space observational network
- Data management and distribution

Strategic Goal 1: Address South Africa's challenges through space services and products

### Space Weather Services

Space weather is an important field of research as severe solar storms can affect the technology, society has become increasingly dependent on. Space Weather is a global phenomenon that has regional impact. SANSA aims to develop expertise in the impact areas that affect South Africa to enable decision-makers to take the necessary mitigation steps. The relevant technologies that are vulnerable to space weather are:

- (a) **Satellite systems:** Space weather events may affect the electronics, communication and navigation systems of a satellite. These events can also cause changes in the satellite orbit, and lead to interrupted telemetry. Satellites play a vital role in the communication and navigation sector as well as base systems such as in banking,

medicine and disaster and resource management etc., therefore the loss of a satellite system or its use (even for a short time) can result in significant economic losses impacting various sectors.

- (b) **Electric power networks:** Space weather changes may result in Geomagnetically Induced Currents (GICs) flowing in long distance pipelines such as those utilised in the national power grid and in some mining applications. GICs may result in the damage of costly transformers with significant economic loss to the country due to power outages.
- (c) **Satellite-based navigation:** Satellite-based navigation (e.g. GPS) range errors increase when there is a variation in the total electron content induced by a space weather event. This can impact, for example, the aviation sector that is dependent on satellite-based navigation as a primary tool for landing systems as well as other navigation applications.
- (d) **Satellite-based communication:** Radio signals propagating from satellites to the Earth through the ionosphere can be disrupted by space weather events. This could, in turn, cause interruptions to radio communication from satellites such as voice, video, weather, avionics and satellite provided internet data.
- (e) **HF-based communication:** The extent to which radio signals within the High Frequency (HF) band travelling through the ionosphere are refracted, attenuated and absorbed is dependent on the geomagnetic conditions in space, which in turn depends on space weather conditions. Adverse space weather may lead to HF radio communication blackout, both ground to ground, and ground to air, which affects the defence, aviation, and amateur radio sectors.
- (f) **Aviation:** Space weather impacts on aviation can include effects such as disruption in HF communications, satellite navigation system errors, and avionics reliability. In addition, space weather events can increase radiation levels on-board planes, particularly long-haul flights because they fly at higher altitudes. The aviation industry require space weather products that assist with flight planning, and the International Civil Aviation Organisation (ICAO) have recommended that by 2018 all flight plans include space weather information by law. SANSa aims to be ready to provide this service, and to assist the aviation sector in space weather preparedness.

SANSa operates the Space Weather Regional Warning Centre for Africa, which forms part of the International Space Environment Service (ISES). The Centre provides an important service to the nation by monitoring the sun and its activity to provide information, early warnings and forecasts on space weather conditions. Space weather and related geospace products and services are required primarily for communication and navigation systems, in the defence, aeronautics, aviation, navigation and communication sectors. SANSa currently provides daily (working day) space weather updates and early warnings, and an on-call service for clients as well as space weather training courses to improve utilisation of the provided information. The Centre has a mobile SMS and email warning system to facilitate emergency warnings. Client specific web-based services are also provided to ensure that the different sectors receive the information in the most appropriate format for their usage. Priorities for 2018/19 include:

- further improvements to the space weather product and service portfolio;
- continued delivery of products and services to relevant sectors;

- enhancement of capability to meet the ICAO requirements for the provision of space weather information to the aviation sector;
- verification of space weather forecasts and predictions; and
- research into appropriate space weather related products and services.

### **Magnetic Technology Services**

SANSA operates a magnetically clean facility that includes a large three axis Helmholtz coil system and a Non-magnetic temperature chamber among other specialised magnetic technology related equipment. The facility provides an important service to the nation and clients in both the space and non-space sectors through the provision of electric and magnetic navigation ground support, magnetic field modelling, and other magnetic technology services such as landing compass calibrations, and magnetic sensor sourcing and integration. In addition, SANSA provides much needed onsite training and development to both private and defence users. SANSA's magnetic technology services are primarily provided to the defence, navigation and aviation sectors. Priorities for 2018/19 include:

- continued support to the defence, aviation and maritime sectors;
- enhanced provision of magnetic related services to the space industry;
- an increased focus on magnetic sensor integration; and
- the provision of magnetic technology services to the national and international space community.

### **Strategic Goal 2: Lead high-impact collaborative R&D on a national scale**

Conduct space science research and create new knowledge and a better understanding of the universe and the near-Earth space environment. Utilise this knowledge to further develop and enhance applications, and to contribute towards the knowledge economy. SANSA also provides research leadership for the nation through publication in high-impact journals, success in both national and international research proposals, and the ratings of its researchers.

Global partnerships with ISES, INTERMAGNET, EISCAT, SuperDARN, COSPAR, SCAR and various space agencies/entities will be strengthened, and stronger participation in international research proposals will be pursued. SANSA's strength as a gateway to Africa and Antarctica will be leveraged to ensure collaboration and participation in international projects for national researchers and engineers. The SANSA Geophysical Instrumentation Network, Optical Space Research Laboratory (OSR) and Antarctic and Islands Programmes will be the main vehicles for these partnerships. SANSA is also a sought after host for regional and international researchers and students, and through existing partnerships many visitors are hosted each year on specific research projects. SANSA will continue its partnership in the International Space Weather Camp, and the University of Michigan student research programmes, as well as to be a host for the SCOSTEP scholars (who are mostly from other African countries).

Priorities for 2018/19 include:

- Continuation of internationally recognised space environment focused research;
- Participation in international research proposals;
- Hosting regional and international researchers and students;



- Participation in International Space Weather Camp and other space science related schools and workshops;
- Attendance of relevant strategically chosen conferences and workshops.

### Strategic Goal 3: Develop national human capacity and ensure transformation

Science advancement will focus more on the southern provinces working together with the other SANSA programmes that focus on the more northern parts of the country. The SANSA Science Centre and the Mobile Lab will form the primary instruments for learner and educator engagement. Student training will be pursued through targeted funding, assisted supervision, the provision of relevant space-related projects, university partnerships and collaboration with the National Astronomy and Space Science Programme (NASSP). The Space Science Programme will continue to lead the student development programme for SANSA.

Priorities for 2018/19 include:

- Utilisation of space as a driver to create excitement in science and technology by optimising the use of the science centre and mobile lab;
- Participation in National Science Week and World Space Week;
- Participation in University career days and fairs, and actively seeking good quality postgraduate students for SANSA's programmes;
- Seeking opportunities for development of student's capabilities, and for funding students for international studies.

### Strategic Goal 4: Enhance the competitiveness of the South African space industry

SANSA operates a wide and multi-faceted geo-space observational network in the southern African region extending to Antarctica and the Atlantic Islands. This provides a geo-space laboratory for the country to conduct cutting-edge research on the near-Earth space environment, and to lead the quest for innovative solutions and new science. SANSA's geomagnetic observatories form the foundation on which many of the space related applications are based, as well as upon which the space environment research is conducted. The management, maintenance and operations of the SANSA instrumentation network in order to deliver accurate reliable data as soon as possible is also an important component.

Priorities for 2018/19 include:

- Continuation of the Geomagnetic Observatory Upgrade project;
- Continued participation in the SANAP programme;
- Final phase of the SANDIMs project;

## Programme Performance Indicators and Quarterly Targets - 2018/19

### SPACE SCIENCE PROGRAMME

| Space Science Programme  |   |  |  | Quarterly Targets  |  |  |   |
|--|---|--|--|--|--|--|---|
| Strategic Goal   | Strategic Objective   | Key Performance Indicator/Measure                | Annual Target  | Q1   | Q2   | Q3   | Q4  |
| <b>Goal 1:</b> Address South Africa's challenges through space services and products | S1.1 Lead and facilitate the creation of high-impact applications to address society's needs and challenges | M1.1 Number of national high-impact applications | Space weather products and services <ul style="list-style-type: none"> <li>• HF Propagation Prediction Services</li> <li>• Space Weather Bulletins &amp; Alerts</li> <li>• Space Weather Course</li> <li>• Space Weather Support Tools</li> </ul> (Progressive Qualitative Target) | Provide daily space weather bulletins and HF predictions through subscription service and on website; Deliver all requested special predictions: Inform clients of adverse space weather as warnings through subscription service; Provide space weather support as requested; Deliver any requested space weather training courses.<br><br>Quarterly report on products and services. | Provide daily space weather bulletins and HF predictions through subscription service and on website; Deliver all requested special predictions; Inform clients of adverse space weather as warnings through subscription service; Provide space weather support as requested; Deliver any requested space weather training courses;<br><br>Quarterly report on products and services. | Provide daily space weather bulletins and HF predictions through subscription service and on website; Deliver all requested special predictions; Inform clients of adverse space weather as warnings through subscription service; Provide space weather support as requested; Deliver any requested space weather training courses;<br><br>Quarterly report on products and services. | Provide daily space weather bulletins and HF predictions through subscription service and on website; Deliver all requested special predictions; Inform clients of adverse space weather as warnings through subscription service; Provide space weather support as requested.<br><br>Final report on products and services |

| Space Science Programme   |  |   |   | Quarterly Targets   |   |   |  |
|---|--|---|---|---|---|---|--|
| Strategic Goal  | Strategic Objective                              | Key Performance Indicator/Measure                                     | Annual Target   | Q1  | Q2  | Q3  | Q4   |
|   |  |   | Magnetic Technology products and services <ul style="list-style-type: none"> <li>• Compass Calibrations</li> <li>• Magnetic Navigation Ground Support Services</li> <li>• Magnetic Field Model Maps</li> <li>• Magnetic Sensor Sourcing</li> <li>• Aircraft Swing Courses</li> </ul> (Progressive Qualitative Target) | Calibrate at least 25 compasses for private and defence clients;<br><br>Provide all requested magnetic navigation ground support consultation, magnetic field variation, aircraft swing courses & magnetic sensor services.<br><br>Deliver any magnetic technology related courses or training assistance required.<br><br>Quarterly report on products and services. | Calibrate at least 25 compasses for private and defence clients;<br><br>Provide all requested magnetic navigation ground support consultation, magnetic field variation, aircraft swing courses & magnetic sensor services.<br><br>Deliver any magnetic technology related courses or training assistance required.<br><br>Quarterly report on products and services. | Calibrate at least 25 compasses for private and defence clients;<br><br>Provide all requested magnetic navigation ground support consultation, magnetic field variation, aircraft swing courses & magnetic sensor services.<br><br>Deliver any magnetic technology related courses or training assistance required.<br><br>Quarterly report on products and services. | Calibrate at least 25 compasses for private and defence clients;<br><br>Provide all requested magnetic navigation ground support consultation, magnetic field variation, aircraft swing courses & magnetic sensor services.<br><br>Deliver any magnetic technology related courses or training assistance required.<br><br>Final report on products and services |
| <b>Goal 2: Lead high-impact collaborative R&amp;D on a national scale</b> | S2.1 Increase the national space research output | M2.1 The national research productivity score for space supported R&D | 1000  | 150   | 300   | 300   | 250  |
| <b>Goal 3: Develop national human capacity and ensure transformation</b>  | S3.1 Increase youth awareness of science         | M3.1 The number of youth directly engaged                             | 5400  | 1500  | 2000  | 1000  | 500  |

| Space Science Programme                           |  |   |               | Quarterly Targets |    |    |                    |
|---|--|---|---------------|-------------------|----|----|--------------------|
| Strategic Goal                                    | Strategic Objective  | Key Performance Indicator/Measure   | Annual Target | Q1                | Q2 | Q3 | Q4                 |
|   | S3.2 Support students and interns  | M3.2 The number of students and interns supported for formalised training | 20            | 20                | 0  | 0  | Not measured in Q4 |
| <b>Goal 5: Develop active global partnerships</b> | S5.1 Leverage a significant benefit for the space programme through partnerships | M5.1.1 Number of active formal overseas partnerships                      | 2             | 1                 | 0  | 1  | 0                  |
|   |  | M5.1.2 Number of active formal African partnerships                       | 2             | 1                 | 0  | 1  | 0                  |
|   |  | M5.1.3 Number of active formal national partnerships                      | 2             | 1                 | 0  | 1  | 0                  |

## Reconciling performance targets with the Budget and MTEF

### Space Science Programme - Revenue Estimates

Table xx: Space Science Programme - Revenue Estimates

| Rand  | Audited           | Audited           | Audited           | Approved          | Revised           | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|   | Outcomes          | Outcomes          | Outcomes          | Budget            | Budget            | 2018/19                           | 2019/20           | 2020/21           |                    |
|   | 2014/15           | 2015/16           | 2016/17           | 2017 / 2018       | 2017/18           | 2018/19                           | 2019/20           | 2020/21           |                    |
| <b>REVENUE</b>                                  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Revenue from Non - Exchange Transactions</b> | <b>27 434 024</b> | <b>30 287 643</b> | <b>29 670 026</b> | <b>27 819 694</b> | <b>31 169 261</b> | <b>28 488 133</b>                 | <b>30 123 669</b> | <b>31 826 559</b> | <b>90 438 361</b>  |
| <b>Operational Transfers</b>                    | 23 665 000        | 23 355 000        | 23 828 000        | 25 819 694        | 25 819 694        | 25 616 633                        | 27 051 164        | 28 538 978        | 81 206 776         |
| Parliamentary Grant                             | 23 665 000        | 23 355 000        | 23 828 000        | 25 819 694        | 25 819 694        | 25 616 633                        | 27 051 164        | 28 538 978        | 81 206 776         |
| <b>Ring fenced Grants</b>                       | <b>3 769 024</b>  | <b>6 932 643</b>  | <b>5 842 026</b>  | <b>2 000 000</b>  | <b>5 349 567</b>  | <b>2 871 500</b>                  | <b>3 072 505</b>  | <b>3 287 580</b>  | <b>9 231 585</b>   |
| Post graduate student bursary support -NRF      | -                 | -                 | -                 | -                 | 1 366 623         | 1 290 000                         | 1 380 300         | 1 476 921         | 4 147 221          |
| Post graduate student bursary support -DST      | -                 | -                 | 2 548 523         | -                 | -                 | -                                 | -                 | -                 | -                  |
| Research Grants                                 | 3 769 024         | 6 932 643         | 3 293 503         | 2 000 000         | 3 982 943         | 1 581 500                         | 1 692 205         | 1 810 659         | 5 084 364          |
|   | -                 | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| <b>Revenue from Exchange Transactions</b>       | <b>8 105 202</b>  | <b>9 294 149</b>  | <b>10 460 540</b> | <b>7 786 000</b>  | <b>10 739 389</b> | <b>8 871 427</b>                  | <b>9 492 427</b>  | <b>10 156 897</b> | <b>28 520 751</b>  |
| <b>Rendering of Services</b>                    | <b>7 746 359</b>  | <b>8 484 872</b>  | <b>8 806 902</b>  | <b>7 786 000</b>  | <b>10 078 843</b> | <b>8 751 427</b>                  | <b>9 364 027</b>  | <b>10 019 509</b> | <b>28 134 963</b>  |
| Contract Revenue - Public Sector                | 6 988 023         | 6 819 835         | 6 616 239         | 6 400 000         | 8 136 397         | 7 925 327                         | 8 480 100         | 9 073 707         | 25 479 134         |
| Contract Revenue - Private Sector               | 561 612           | 995 755           | 540 968           | 680 000           | 429 508           | 365 000                           | 390 550           | 417 889           | 1 173 439          |
| Contract Revenue - Foreign                      | 196 724           | 669 282           | 1 649 695         | 706 000           | 1 512 938         | 461 100                           | 493 377           | 527 913           | 1 482 390          |
| <b>Other Income</b>                             | <b>358 843</b>    | <b>809 277</b>    | <b>1 653 638</b>  | <b>-</b>          | <b>660 546</b>    | <b>120 000</b>                    | <b>128 400</b>    | <b>137 388</b>    | <b>385 788</b>     |
| Interest Income                                 | 168 713           | 334 136           | 432 704           | -                 | 381 048           | -                                 | -                 | -                 | -                  |
| Other Income                                    | 190 130           | 475 141           | 1 220 934         | -                 | 197 601           | 120 000                           | 128 400           | 137 388           | 385 788            |
| Net Gains on Foreign exchange transactions      | -                 | -                 | -                 | -                 | 81 897            | -                                 | -                 | -                 | -                  |
| Accumulated surplus roll over                   |                   |                   |                   |                   | 4 809 478         |                                   |                   |                   |                    |
| <b>Total Revenue</b>                            | <b>35 539 226</b> | <b>39 581 792</b> | <b>40 130 566</b> | <b>35 605 694</b> | <b>46 718 128</b> | <b>37 359 560</b>                 | <b>39 616 096</b> | <b>41 983 456</b> | <b>118 959 112</b> |

The Space Science programme has an allocation of R118 million over the medium term, with annual allocations of R37 million in 2017/18, R39 million in 2018/19 and R42 million in 2020/21. The major expense allocation is in employee costs attributed to scientists and engineers focused on fundamental and applied space science research, the management of scientific data ground segments, and the provision of space weather and other geo-space products and services.

## Space Science Programme - Expenditure Estimates

Table 15: Space Science Programme - Expenditure Estimates

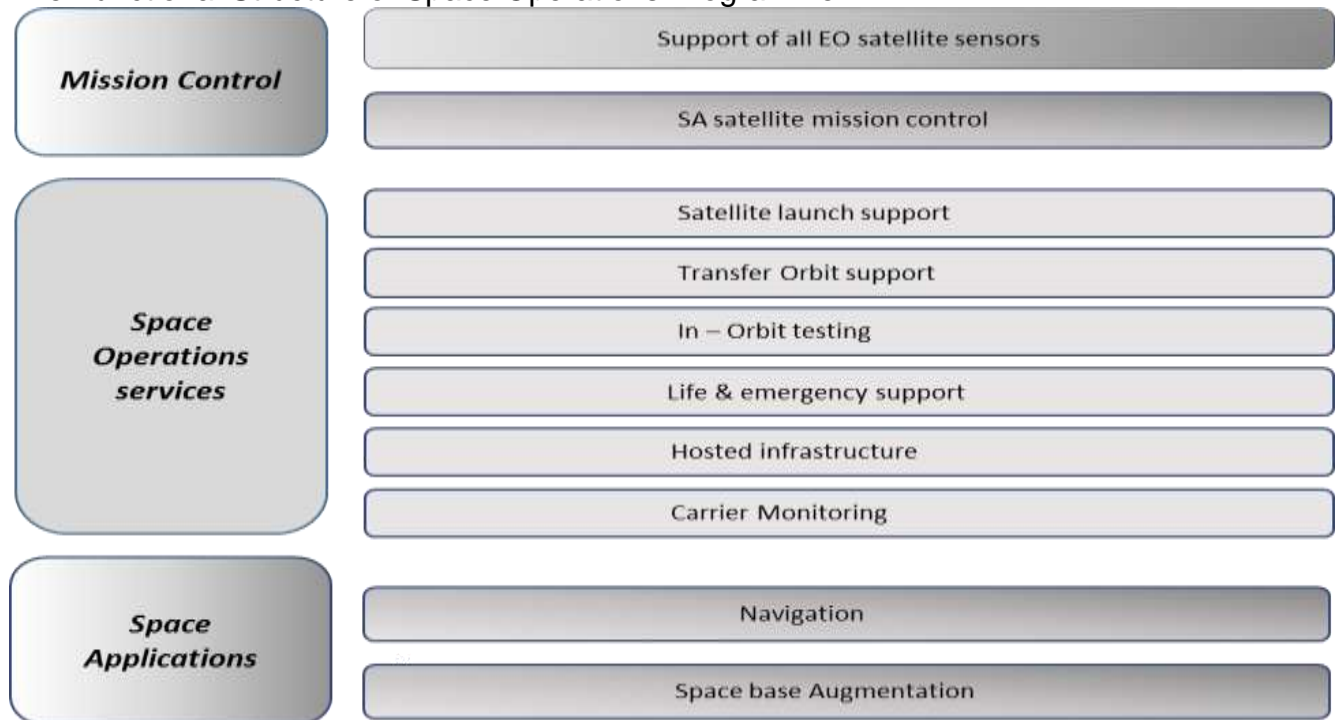
| Rand   | Audited           | Audited           | Audited           | Approved          | Revised           | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|  | Outcomes          | Outcomes          | Outcomes          | Budget            | Budget            | 2018/19                           | 2019/20           | 2020/21           |                    |
|  | 2014/15           | 2015/16           | 2016/17           | 2017 / 2018       | 2017/18           |                                   |                   |                   |                    |
| <b>Expenditure</b>                             |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Employee Related Costs                         | 20 407 777        | 19 713 778        | 22 862 526        | 25 695 170        | 23 756 969        | 27 488 459                        | 29 027 813        | 30 587 679        | 87 103 950         |
| Board Member Remuneration                      | -                 | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Depreciation and Amortisation                  | 4 127 611         | 4 437 251         | 4 433 370         | -                 | -                 | -                                 | -                 | -                 | -                  |
| Repairs and Maintenance                        | 638 640           | 1 399 786         | 1 009 648         | 880 079           | 2 883 754         | 1 212 628                         | 908 672           | 769 325           | 2 890 625          |
| Finance Costs                                  | 20 072            | 77                | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Data Licence fees                              | 5 475             | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Grants and Subsidies Paid                      | 1 717 328         | 2 202 502         | 3 080 193         | 1 927 293         | 1 788 360         | 2 588 000                         | 2 769 160         | 2 963 001         | 8 320 161          |
| Antenna Infrastructure Services                | -                 | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Training Expenses                              | 300 614           | 205 224           | 213 343           | 145 442           | 468 650           | 195 000                           | 208 650           | 223 256           | 626 906            |
| General Expenses                               | 7 362 257         | 7 051 604         | 7 175 772         | 6 036 206         | 9 361 890         | 5 538 373                         | 6 341 105         | 7 054 249         | 18 933 727         |
| Net Losses on foreign exchange transactions    | -                 | 65 821            | -116 858          | -                 | 52 881            | -                                 | -                 | -                 | -                  |
| Loss on Disposal of Property, Plant and Equipm | 30 694            | 1 134 770         | 213 908           | -                 | -                 | -                                 | -                 | -                 | -                  |
| <b>Total Operating Expenditure</b>             | <b>34 610 468</b> | <b>36 210 813</b> | <b>38 871 902</b> | <b>34 684 190</b> | <b>38 312 504</b> | <b>37 022 460</b>                 | <b>39 255 399</b> | <b>41 597 510</b> | <b>117 875 369</b> |
|  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Surplus / (Deficit) for the year</b>        | <b>1 658 489</b>  | <b>4 993 243</b>  | <b>2 951 114</b>  | <b>921 504</b>    | <b>8 405 624</b>  | <b>337 100</b>                    | <b>360 697</b>    | <b>385 946</b>    | <b>1 083 743</b>   |
|  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Capital Expenditure</b>                     | <b>1 658 489</b>  | <b>4 993 243</b>  | <b>2 951 114</b>  | <b>921 504</b>    | <b>8 405 624</b>  | <b>337 100</b>                    | <b>360 697</b>    | <b>385 946</b>    | <b>1 083 743</b>   |
| Buildings and other fixed structures           | -                 | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Machinery and equipment                        | 1123577           | 897 094           | 1 951 540         | 471 378           | 4 616 911         | 337 100                           | 360 697           | 385 946           | 1 083 743          |
| Computer Equipment                             | 345265            | 3 548 908         | 984 615           | 450 125           | 3 458 265         | -                                 | -                 | -                 | -                  |
| Software and intangible assets                 | 14747             | 6 180             | 14 959            | -                 | 30 448            | -                                 | -                 | -                 | -                  |
| Vehicles                                       | 174 900           | 541 062           | -                 | -                 | 300 000           | -                                 | -                 | -                 | -                  |
|  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| <b>Total Expenditure</b>                       | <b>36 268 957</b> | <b>41 204 056</b> | <b>41 823 016</b> | <b>35 605 694</b> | <b>46 718 128</b> | <b>37 359 560</b>                 | <b>39 616 096</b> | <b>41 983 456</b> | <b>118 959 112</b> |

## PROGRAMME 4: SPACE OPERATIONS PROGRAMME (SOP)

### Purpose

The Space Operations Programme is responsible for the acquisition of satellite data for the Earth Observation Programme and the provision of ground segment support. Through this programme, SANSA conducts various space operations, including launch and early orbit support, in-orbit testing, satellite life-cycle support and satellite mission control for both national and international space industry clients and governments. The programme also supplies hosting capabilities with the intention of expanding this capability to Teleports.

### The Functional Structure of Space Operations Programme



### Strategic Focus

Goal 4: Enhance the competitiveness of the South African space industry

- Data acquisition for the Earth Observation Programme
- Space operations support for various global launch activities
- Satellite in-orbit-testing
- Carrier monitoring
- Hosting of space operations infrastructure
- Satellite-based navigation
- Teleport hosting

Strategic Goal 4: Enhance the competitiveness of the South African space industry

### Earth Observation Support

A large proportion (100%) of SANSA's space operations activities with respect to daily passes of Low Earth Orbit (LEO) satellites are devoted to data acquisition for the Earth Observation Programme. A total of 5150 satellite passes are forecast for the year for EO with a targeted [SANSA Annual Performance Plan 2018/19](#)

success pass acquisition of 98%. The intention is to automate the process in the future. This would lead the organisation to be more efficient enabling it to maintain the current success rate.

### **Teleport hosting**

SANSA will concentrate on developing its infrastructure in order to enable it to host teleport like services. This will enhance the Agency sustainability and provide a redundant fibre link to a central hub in SA.

### **Satellite support**

The SOP also provides satellite support to various clients on a commercial basis, generating a significant income stream for SANSA. Global market surveys predict satellite activity to increase from about 77 launches per annum (2000-2009) to about 120 launches per annum (2010-2019). In line with this, there is an anticipated increase in SANSA's satellite launch and general orbital support business.

### **Navigation**

Another area of growth is that of satellite-based navigation augmentation services; and communication using satellites. Navigation services will be pursued in close cooperation with the Department of Transport and its agencies, while communication has to be strongly informed by the satellite communication strategy of the Department of Communications. Given the commercial nature of navigation and communication services, SANSA will also interact closely with private industry in these areas. Over the next five years, the plan is to have a fully functional open-service navigation augmentation system that is at an advanced stage in terms of Safety-of-Life certification.

### **Income Generation**

The SOP activities generate large foreign revenue with some local income from EO data acquisition and defence related work and local organisations. The value of the programmes activities is related to its self-funding ability. Therefore, the level of income generated is important. The targeted revenue to be generated for 2016/17 was R60 million, an increase of R5 million from the 2014/15 baseline of R55 million.

- Data acquisition for the EOP
- Space operations support for various global launch activities
- Satellite in-orbit-testing
- Carrier monitoring
- Hosting of space operations infrastructure
- Satellite-based navigation
- Teleport hosting



## Programme Performance Indicators and Quarterly Targets - 2018/19

### SPACE OPERATIONS PROGRAMME

| Space Operations Programme  |   |  |                 | Quarterly Targets |            |               |             |
|---|---|--|-----------------|-------------------|------------|---------------|-------------|
| Strategic Goal  | Strategic Objective   | Key Performance Indicator/Measure                                      | Annual Target   | Q1                | Q2         | Q3            | Q4          |
| Goal 4: Enhance the competitiveness of the South African space industry | S4.1 Generate greater benefit for the space programme through space operations activities | M4.1.1 Successful satellite pass monitoring rate for Earth Observation | Proportion: 98% | 98%               | 98%        | 98%           | 98%         |
|   |   | M4.1.2: Total income generated from space operations activities        | R58 million     | R14.5 million     | R29million | R43,5 million | R58 million |

## Reconciling performance targets with the Budget and MTEF

### Space Operations Programme - Revenue Estimates

Table xx: Space Operations Programme - Revenue Estimates

| Rand                                       | Audited           | Audited           | Audited           | Approved          | Revised           | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|  | Outcomes          | Outcomes          | Outcomes          | Budget            | Budget            | 2018/19                           | 2019/20           | 2020/21           |                    |
|  | 2014/15           | 2015/16           | 2016/17           | 2017 / 2018       | 2017/18           | 2018/19                           | 2019/20           | 2020/21           |                    |
| <b>REVENUE</b>                             |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Revenue from Non - Exchange Transactions   | 201 600           | 8 367 999         | -                 | 12 967 917        | 12 967 917        | 13 263 459                        | 14 090 264        | 14 865 228        | 42 218 950         |
| <b>Operational Transfers</b>               |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Internal revenue                           | -                 | 8 367 999         | -                 | 12 967 917        | 12 967 917        | 13 263 459                        | 14 090 264        | 14 865 228        | 42 218 950         |
| <b>Ring fenced Grants</b>                  |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Post graduate student bursary support -NRF | 201 600           | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| Satellite Development Programme            | -                 | -                 | -                 | -                 | -                 | -                                 | -                 | -                 | -                  |
| <b>Revenue from Exchange Transactions</b>  | <b>44 212 033</b> | <b>74 575 201</b> | <b>66 900 674</b> | <b>47 565 459</b> | <b>51 228 849</b> | <b>49 049 169</b>                 | <b>52 457 185</b> | <b>56 709 014</b> | <b>158 215 368</b> |
| Rendering of Services                      | 43 334 775        | 68 023 332        | 52 653 295        | 47 565 459        | 50 141 321        | 49 049 169                        | 52 457 185        | 56 709 014        | 158 215 368        |
| Contract Revenue - Public Sector           | 4 955 695         | 5 081 776         | 5 768 950         | 5 754 907         | 4 766 490         | 5 015 801                         | 5 296 686         | 5 588 004         | 15 900 492         |
| Contract Revenue - Private Sector          | 8 500             | 8 900             | 18 000            | 8 900             | 3 773 760         | 1 746 833                         | 1 844 655         | 1 946 111         | 5 537 599          |
| Contract Revenue - Foreign                 | 38 370 580        | 62 932 656        | 46 866 345        | 41 801 652        | 41 601 071        | 42 286 535                        | 45 315 844        | 49 174 898        | 136 777 277        |
| Other Income                               | 877 259           | 6 551 869         | 14 247 379        | -                 | 1 087 528         | -                                 | -                 | -                 | -                  |
| Interest Income                            | 865 914           | 1 898 881         | 164 406           | -                 | 520 015           |                                   |                   |                   | -                  |
| Other Income                               | 177 055           | 4 652 988         | 14 082 973        | -                 | 20 278            |                                   |                   |                   | -                  |
| Net Gains on Foreign exchange transactions | -165 710          | -                 | -                 | -                 | 547 235           |                                   |                   |                   | -                  |
| Accumulated surplus roll over              |                   |                   |                   |                   | 35 608 713        |                                   |                   |                   |                    |
| <b>Total Revenue</b>                       | <b>44 413 633</b> | <b>82 943 200</b> | <b>66 900 674</b> | <b>60 533 377</b> | <b>99 805 479</b> | <b>62 312 628</b>                 | <b>66 547 449</b> | <b>71 574 242</b> | <b>200 434 318</b> |

The budget for the medium term is externally sourced at R200 million, with annual revenue generation of R62 million in 2018/19 and R66 million in 2019/20 and R72 million in 2020/21. In order to maintain the investments in the antenna infrastructure and related operating systems, international client's infrastructure is hosted to generate more income for the daily operations. Current estimates for the medium term indicate that most of the fixed term hosting contracts from international clients are reaching the end of term and will be renewed as and when. The launch support revenue is excluded from the estimates, as it is difficult to estimate the probability of the launches happening, as well as the success of the launches. With the available budget, expenditure is largely on man-hours for the maintenance support and operations staff, as well as the ICT infrastructure and communication networks, and repairs and maintenance for ground infrastructure equipment. Capital items are planned purchases as and when capital funds are available or rolled over from previous year financial surpluses.

## Space Operations Programme - Expenditure Estimates

Table 18: Space Operations Programme - Expenditure Estimates

| Rand  | Audited Outcomes  | Audited Outcomes  | Audited Outcomes  | Approved Budget   | Revised Budget    | Medium Term Expenditure Framework |                   |                   | Total MTEF         |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------------|-------------------|-------------------|--------------------|
|   | 2014/15           | 2015/16           | 2016/17           | 2017 / 2018       | 2017/18           | 2018/19                           | 2019/20           | 2020/21           |                    |
| <b>Expenditure</b>                                |                   |                   |                   |                   |                   |                                   |                   |                   |                    |
| Employee Related Costs                            | 27 469 993        | 29 682 347        | 31 231 084        | 31 993 000        | <b>33 910 627</b> | 33 107 350                        | 34 963 550        | 36 881 074        | 104 951 974        |
| Board Member Remuneration                         | -                 | -                 | -                 | -                 | -                 |                                   |                   |                   | -                  |
| Depreciation and Amortisation                     | 9 609 591         | 9 675 833         | 9 725 172         | -                 | -                 |                                   |                   |                   | -                  |
| Repairs and Maintenance                           | 2 420 188         | 3 662 999         | 3 677 254         | 5 537 772         | <b>13 813 533</b> | 3 722 929                         | 4 275 093         | 4 467 260         | 12 465 282         |
| Antenna Infrastructure Services                   | 1 102 997         | 4 146 811         | 203 266           | -                 | <b>2 971 575</b>  |                                   |                   |                   | -                  |
| Training Expenses                                 | 740 007           | 549 831           | 150 574           | 563 402           | <b>396 904</b>    | 352 850                           | 372 610           | 393 103           | 1 118 563          |
| General Expenses                                  | 18 196 678        | 14 680 746        | 15 888 276        | 18 439 203        | <b>18 123 662</b> | 23 129 498                        | 23 936 196        | 25 832 805        | 72 898 499         |
| Net Losses on foreign exchange transactions       | -                 | 79 894            | 1 321 073         | -                 | -                 |                                   |                   |                   | -                  |
| Loss on Disposal of Property, Plant and Equipment | 99 580            | 14 301            | 314 394           | -                 | 3 303             |                                   |                   |                   | -                  |
| <b>Total Operating Expenditure</b>                | <b>59 639 034</b> | <b>62 492 762</b> | <b>62 511 093</b> | <b>56 533 377</b> | <b>69 219 604</b> | <b>60 312 628</b>                 | <b>63 547 449</b> | <b>67 574 242</b> | <b>191 434 318</b> |
|   |                   |                   |                   |                   | -                 |                                   |                   |                   |                    |
| <b>Surplus / (Deficit) for the year</b>           | <b>16 942 237</b> | <b>5 153 316</b>  | <b>16 023 356</b> | <b>4 000 000</b>  | <b>30 585 875</b> | <b>2 000 000</b>                  | <b>3 000 000</b>  | <b>4 000 000</b>  | <b>9 000 000</b>   |
| <b>Capital Expenditure</b>                        | <b>16 942 237</b> | <b>5 153 316</b>  | <b>16 023 356</b> | <b>4 000 000</b>  | <b>30 585 875</b> | <b>2 000 000</b>                  | <b>3 000 000</b>  | <b>4 000 000</b>  | <b>9 000 000</b>   |
| Buildings and other fixed structures              | -                 | -                 | -                 | -                 | -                 |                                   |                   |                   | -                  |
| Machinery and equipment                           | 16 942 237        | 5 153 316         | 16 023 356        | 4 000 000         | 30 585 875        | 2 000 000                         | 3 000 000         | 4 000 000         | 9 000 000          |
| <b>Total Expenditure</b>                          | <b>76 581 271</b> | <b>67 646 078</b> | <b>78 534 449</b> | <b>60 533 377</b> | <b>99 805 479</b> | <b>62 312 628</b>                 | <b>66 547 449</b> | <b>71 574 242</b> | <b>200 434 318</b> |

## PROGRAMME 5: SPACE ENGINEERING PROGRAMME (SEP)

### Purpose

The Space Engineering Programme leads systems engineering and project management excellence and drives a small satellite development programme in South Africa in partnership with external contractors, R&D institutions and private sector partners. The programme conducts satellite and sub-systems analysis, leads the technical side of the space programme project management, human capital development in space engineering as well as facilitates private space industry partnerships.

### Strategic Focus

Goal 2: Lead high-impact collaborative R&D on a national scale

- Industry development

Goal 3: Develop national human capacity and ensure transformation

- Student and intern training
- Student funding

Goal 4: Enhance the competitiveness of the South African space industry

- EO-Sat1 development
- Facilities development

### Strategic Goal 2: Lead high-impact collaborative R&D on a national scale

#### Contracting value to private SME space industry

SANSA's mandate, as prescribed in the SANSA Act, is to stimulate the South African space industry. Therefore, SANSA will ensure that its contracting efforts are tailored to stimulate the private industry for the benefit of the country. This will entail setting clear private company outsourcing targets. The industries to be targeted are both in the space technology development sectors and the Earth observation value-adding services.

#### Contracting value to public and private space industry

To meet SANSA's mandate of stimulating the space industry as a whole, the Agency will ensure that there is significant contracting of the space industry. Space, by its nature, is high risk and globally relies heavily on government as the anchor client for the national space industry of a particular country. SANSA, as the lead implementer of the space programme, has to provide the necessary anchor to the local space industry. This requires ensuring steady contracting to provide the base work to keep the industry going. The targeted broad industry contractual spend is R65 million over the five-year period. Support for these industries and the embedded small medium enterprises will be through mechanisms such as the DST led Technology Localisation Programme (TLP), which spearheads the improvement of the technological capability of local firms leading to increased competitiveness (quality, cost, customisation), expanding capabilities (new products, services) and expanding into new markets both locally and globally.

#### Industry Development

Space Engineering aims to empower South Africa to re-establish the Space Industry across the different value chains, whilst optimising the capital made available by Government. The identification of the technologies required to satisfy the developing space industry in South Africa will provide input into the development of Centres of Excellence, or Centres of

Competence, that exist in South Africa that harbour those technologies at different levels of expertise. This will further add value to human capital development by encouraging the universities, through grants, to offer relevant courses or improve/extend courses in sciences, technology and other disciplines leading to the development of human capability with focus on the relevant space sciences.

All space programmes aim to fully implement a space mission. Various technologies define space programmes to be developed for particular user requirements. Due to the complexity of a space programme, clear roles and responsibilities need to be identified in support of the broader mission objectives. Contracting strategy becomes critical in the development of a space programme. Often the prime contractor is responsible for the interface between space engineering and the product. A well-defined contracting strategy is critical to ensure industry development and localisation. SANSA, as an agency, will provide the capability of realising the space programme through engineering, technical, economics and human capital support.

The following are the key areas of support A centre of competency (CoC) in optical payload development capabilities in South Africa, consists of distributed, uncoordinated capabilities across the national system of innovation including industry, universities and science councils. In order to sustain these capabilities a national effort needs to be consolidated under the CoC to focus all efforts under the same programme.

### Strategic Goal 3: Develop national human capacity and ensure transformation

South Africa has a shortage of skilled personnel in the space engineering arena particularly from amongst previously disadvantaged individuals. Through the bursary programme and internship programme, SANSA aims to address this by strategically using the satellite build programme as an attractor.

#### Jobs Supported

SANSA and Denel Dynamics have a core complement of employees that are directly involved with the Satellite Development Programme. A total of 55 such employees are forecast for the year depending on the progress of the project. The relevant resources are highly dependent on the supporting contracts for the upgrade to the Houwteq facility.

#### The priorities for the year are:

- Further development of EO-Sat1;
- Engagement with users on EO-Sat1 system deliverables;
- Establishing a Calibration and Validation centre of expertise with various local partners;
- Developing a technology roadmap to support the South African Space industry;
- Establishing areas of competence and expertise within the technology framework with the various institutions in South Africa;
- Reviewing the current state of training in the local space industry;
- Administrate the operations of ZACube2

### Strategic Goal 4: Enhance the competitiveness of the South African space industry

#### EO-Sat1 and Cubesat Development

Preparation for preliminary design reviews will take place during the year and the predesign work on the technical requirements will be completed. Major components will undergo critical design review in preparation for the structural thermal design model. The qualification model will be manufactured and integrated for environmental testing culminating in the qualification of the spacecraft. The system definition activities are to be concluded with the product trees

developed for the segments, to enable the finalisation of the acquisition plan and the procurement plans for the segments. The Ground Segment Architectural Design activities are to be concluded and the contracting baselines established by the Integrated Project Team. Work packages for both the mission control and data acquisition will be activated for final engineering implementation. The AIT facility will be upgraded to meet the minimum requirements for testing of EO-Sat1.

Zacube2 Programme is developed to monitor the oceans economy. The Programme will ensure the successful monitoring of ships bordering the South African coastline. ZACube-2 will be the first phase in developing a constellation to support the Operation Phakisa.

### **Space Programme Management**

The South African Space programme primary focus is on supporting the National Space Programme. Space engineering supports the development of space systems to meet the broader user requirements for operational and scientific requirements of the country. The characteristics of the missions will largely be in the area of EO, marine, communication and science. The NSP provides direction for the requirements of space technologies. A critical role for space engineering is to engage users on the specification of the satellite. Due to the dynamic nature of satellite requirements these often change and are managed independently. SANSA will define missions which, where possible, will include various payloads for different sectors. It is envisaged through systematic approach satellites will be developed to meet the key areas of Environmental Resources Management, Health Safety & Security, and innovation & economic growth. The space programme is also critical for planning and resources skills required by various entities to support government initiatives.

To fulfil the technology risk and the use of various major components, a Space System TRL scale will be used. SANSA will determine the technology readiness level and the level of maturity to be included in the subsystem design process. This further allows an assessment of development areas within the industry. The following are the key areas of focus:

- For any new mission, engineering is involved from feasibility through to integration and commissioning;
- Lead the proposal evaluation team to ensure MRD, TRS (Technical Requirements Specification);
- SPD (Space Programme Division) Programme Management /Contract management;
- System Engineering Part of PDRs (Preliminary Design Review) etc. and Verification and Validation Teams Technical compliance;
- System Engineering meeting potential users and compiles URS (User Requirements Specification);
- Implement NSP: engineering can determine the feasibility and requirements for future missions;
- Establish African space agencies/partners: Reach out to our ARMC partners for information, knowledge and Sys Eng. experience sharing;
- Build Space System Engineering communities with African & International partners;
- Establish better contact with potential Level 5 players and the System Engineering, to start preparing for future missions such as GEO Comms Geostationary Communications Satellite, LEO SAR (Low Earth Orbiting Satellite Aperture Radar), LEO Defence;
- Mission pre-studies on the above missions at level 6 at least 1-2 years before the formal launch of such a project;
- Present papers at local conferences on the work being done at SANSA in Space Engineering (e.g. INCOSE Conference); and

- Address what SO and SPD System Engineering does (telecoms and navigation satellites).

### **Facility development**

In order to embark on providing space systems to Government, facilities become crucial in the implementation of the plan. Having the ownership of Houwteq, SANSA will be able to provide AIT (Assembly, Integration and Testing) services to the South African Space, Automotive, and Defence industries, designed to incentivise the growth of those industries. An added benefit is that through this AIT activity, SANSA will maintain improved contact with the various stakeholders and develop an understanding of their needs and requirements.

The two core areas of development will be in assembly, integration, testing and calibration and validation.

These elements must be unpacked, expanded on and discussed in detail with the aim of constructing a sustainable business case and a plan for development of such a business model. Ultimately, South African must present as a provider of life-cycle development of optical payload development from design, modelling, development, measurement, calibration, test and evaluation. This makes South Africa attractive as a partner for human capital development while ensuring a sustainable optical payload development Centre of Competence. Cal-Val cannot be a sustainable business case on its own. It becomes more attractive when offered as part of a full satellite development programme, with a strong element on data product integrity and quality.

## Programme Performance Indicators and Quarterly Targets - 2018/19

### SPACE ENGINEERING PROGRAMME

| Space Engineering Programme  |   |   | Quarterly Targets  |                        |                                     |                               |  |
|--|---|---|--|------------------------|-------------------------------------|-------------------------------|--|
| Strategic Goal   | Strategic Objective   | Key Performance Indicator/Measure   | Annual Target  | Q1                     | Q2                                  | Q3                            | Q4   |
| <b>Goal 3: Develop national human capacity</b>                                 | S3.2 Support students and interns   | M3.2 Number of students and interns supported for formalised training                             | 15   | 15                     | -                                   | -                             | -  |
| <b>Goal 4: Enhance the competitiveness of the South African space industry</b> | S4.2 Grow the national space industry   | M4.2.1 The number of direct jobs supported externally through SANSA programme contracting         | 55   | 55                     | 55                                  | 55                            | 55   |
|  |   | M4.2.2 The progress status on the EO-Sat1 development   | 70%<br>Critical Design Review (CDR) completed for the space system flight model      | 10% System CDR         | 30% System CDR                      | 50% System CDR                | Full System CDR  |
|  |   | M4.2.3 The total contract expenditure to SMEs for core space projects                             | R10 million  | R2 million             | R2 million                          | R3 million                    | R 3 million  |
|  |   | M4.2.4 The total contract expenditure to the broad space related industry for core space projects | R50 million  | R10 million            | R10 million                         | R15 million                   | R15 million  |
|  |   | M4.2.5 The progress status on the CubeSat development   | 100%<br>Completion of the qualification and flight models, and Launch and Commission | Flight Model completed | Satellite Launched and commissioned | Post Launch evaluation report | Testing and performance review of Zacube2 final report |
| <b>Goal 5: Develop active global partnerships</b>                              | S5.1 Leverage a significant benefit for the space programme through global partnerships | M5.1.1 Number of active overseas partnerships   | 1  | 0                      | 0                                   | 1                             | 0  |
|  |   | M5.1.2 Number of active African partnerships  | 1  | 0                      | 0                                   | 1                             | 0  |
|  |   | M5.1.3 Number of active national partnerships   | 1  | 0                      | 0                                   | 1                             | 0  |

**Note 1:** This target is linked to the satellite development programme. Funding for the programme is not yet confirmed for the 2018 MTEF. As the satellite build programme is still work in progress, the related key performance indicators and targets are reflected with anticipation that funding will be provided for the MTEF.



## Reconciling performance targets with the Budget and MTEF

### Space Engineering Programme - Revenue Estimates

Table xx: Space Engineering Programme - Revenue Estimates

| Rand  | Audited           | Audited            | Audited            | Approved           | Revised            | Medium Term Expenditure Framework |                   |                   | Total MTEF        |
|---|-------------------|--------------------|--------------------|--------------------|--------------------|-----------------------------------|-------------------|-------------------|-------------------|
|   | Outcomes          | Outcomes           | Outcomes           | Budget             | Budget             | 2018/19                           | 2019/20           | 2020/21           |                   |
|   | 2014/15           | 2015/16            | 2016/17            | 2017 / 2018        | 2017/18            |                                   |                   |                   |                   |
| REVENUE   |                   |                    |                    |                    |                    |                                   |                   |                   |                   |
| Revenue from Non - Exchange Transactions                          | 39 979 037        | 99 852 806         | 111 627 276        | 114 681 000        | 109 987 427        | 10 054 654                        | 10 533 663        | 10 750 596        | 31 338 914        |
| Operational Transfers   | -                 | -                  | -                  | -                  | -                  | 10 054 654                        | 10 533 663        | 10 750 596        | 31 338 914        |
| Parliamentary Grant   |                   |                    |                    |                    | -                  | 10 054 654                        | 10 533 663        | 10 750 596        | 31 338 914        |
| Ring fenced Grants  | 39 979 037        | 99 852 806         | 111 627 276        | 114 681 000        | 109 987 427        | -                                 | -                 | -                 | -                 |
| AIT Facilities  | -                 | -                  | 11 774 470         |                    | 6 525 530          |                                   |                   |                   | -                 |
| Operation Phakisa - EO Data                                       | -                 | -                  | -                  |                    | 4 548 000          |                                   |                   |                   | -                 |
| Operation Phakisa - Ocean and Coast Information Management system | -                 | -                  | -                  |                    | 22 044 000         |                                   |                   |                   | -                 |
| Satellite Development Programme                                   | 39 979 037        | 99 852 806         | 99 852 806         | 114 681 000        | 76 869 897         |                                   |                   |                   | -                 |
| Principal/Agent Transfers   | 17 750 534        | 34 225 427         | 8 258 803          | -                  | 9 268 569          | -                                 | -                 | -                 | -                 |
| AIT facilities/Industry Upgrade/Incentives                        | 17 750 534        | 34 225 427         |                    | -                  | -                  |                                   |                   |                   | -                 |
| Operation Phakisa - CPUT  |                   |                    | 8 258 803          | -                  | 9 268 569          |                                   |                   |                   | -                 |
| Other   |                   |                    |                    | -                  | -                  |                                   |                   |                   | -                 |
| <b>Total Revenue</b>  | <b>57 729 571</b> | <b>134 078 233</b> | <b>119 886 079</b> | <b>114 681 000</b> | <b>119 255 996</b> | <b>10 054 654</b>                 | <b>10 533 663</b> | <b>10 750 596</b> | <b>31 338 914</b> |

The satellite build programme has no allocation over the medium term. Funding for the continuation of the programme is yet to be confirmed. The expenditure over the MTEF reflects the funding required to cover employee costs and operational funds for the Space Engineering Division.

## Space Engineering Programme - Revenue Estimates

Table 20: Space Engineering Programme - Expenditure Estimates

| Rand  | Audited           | Audited            | Audited           | Revised            | Medium Term Expenditure Framework |                   |                   | Total MTEF        |
|---|-------------------|--------------------|-------------------|--------------------|-----------------------------------|-------------------|-------------------|-------------------|
|   | Outcomes          | Outcomes           | Outcomes          | Budget             | 2018/19                           | 2019/20           | 2020/21           |                   |
|   | 2014/15           | 2015/16            | 2016/17           | 2017/18            |                                   |                   |                   |                   |
| <b>Expenditure</b>                          |                   |                    |                   |                    |                                   |                   |                   |                   |
| Employee Related Costs                      | -                 | 3 849 186          | 187 088           | 9 092 000          | 8 359 543                         | 8 827 677         | 9 313 199         | 26 500 419        |
| Repairs and Maintenance                     | -                 |                    |                   | 75 000             | -                                 |                   |                   | -                 |
| Data Licence fees                           | -                 |                    |                   | 26 592 000         | -                                 |                   |                   | -                 |
| Grants and Subsidies Paid                   | 17 751 567        | 21 306 554         |                   | 560 000            | 591 920                           | 625 068           | 659 446           | 1 876 434         |
| Antenna Infrastructure Services             | -                 |                    |                   | -                  | -                                 |                   |                   | -                 |
| Training Expenses                           |                   | -                  | 53 920            | 650 000            | -                                 | -                 | -                 | -                 |
| General Expenses                            | 304 184           | 1 097 486          | 1 422 363         | 3 053 236          | 1 103 191                         | 1 080 919         | 777 951           | 2 962 061         |
| Net Losses on foreign exchange transactions | -                 |                    | 826               | -                  |                                   |                   |                   | -                 |
| <b>Total Operating Expenditure</b>          | <b>18 055 751</b> | <b>26 253 226</b>  | <b>1 664 197</b>  | <b>40 022 236</b>  | <b>10 054 654</b>                 | <b>10 533 663</b> | <b>10 750 596</b> | <b>31 338 914</b> |
| <b>Principal/Agent Transfers</b>            | -                 | -                  | -                 | <b>9 268 569</b>   | -                                 | -                 | -                 | -                 |
| AIT facilities/Industry Upgrade/Incentives  |                   |                    |                   | -                  |                                   |                   |                   | -                 |
| Operation Phakisa - CPUT                    |                   |                    |                   | 9 268 569          |                                   |                   |                   | -                 |
|   |                   |                    |                   | -                  |                                   |                   |                   | -                 |
|   |                   |                    |                   | -                  |                                   |                   |                   | -                 |
| <b>Surplus / (Deficit) for the year</b>     | <b>54 394 614</b> | <b>99 853 162</b>  | <b>93 855 378</b> | <b>80 093 760</b>  | <b>0</b>                          | <b>-0</b>         | <b>-</b>          | <b>-0</b>         |
| <b>Capital Expenditure</b>                  |                   |                    |                   |                    |                                   |                   |                   |                   |
| AIT Facility                                | 54 394 614        | 99 853 162         | 93 855 378        | 70 825 191         | -                                 | -                 | -                 | -                 |
| Satellite Development                       |                   |                    |                   | 6 525 530          |                                   |                   |                   | -                 |
|   | 54 394 614        | 99 853 162         | 93 855 378        | 64 299 661         | -                                 | -                 |                   | -                 |
| <b>Total Expenditure</b>                    | <b>72 450 365</b> | <b>126 106 388</b> | <b>95 519 575</b> | <b>120 115 996</b> | <b>10 054 654</b>                 | <b>10 533 663</b> | <b>10 750 596</b> | <b>31 338 914</b> |

## **ANNEXURE A – Amendments to the 2015-2020 Strategic Plan**

### **INTRODUCTION**

The Framework for Strategic Plans and Annual Performance Plans states, “A Strategic Plan may be changed during the five-year period that it covers. However, such changes should be limited to revisions related to significant policy shifts or changes in the service-delivery environment. The relevant institution does this by issuing an amendment to the existing plan, which may be published as an annexure to the Annual Performance Plan, or by issuing a revised Strategic Plan.”

The 2015-2020 SANSА Strategic Plan was implemented for the first time in 2015/16 and in the process of implementation and due to comments from the auditors, it became necessary to modify some of the KPIs and make sure that they are SMART and clear. Listed below are the modifications that have been implemented in red. Furthermore, given the financial constraints, the Agency has scaled down on some of the 2018/19 targets. The changes in the targets are also indicated in red below.

## MODIFICATIONS TO MEASURES OR KPI's OR TARGETS

| Strategic Goal   | Original  | Modification   | 2018/19 Original              | 2018/19 Target | Reason for Modification  |
|--|---|--|-------------------------------|----------------|--|
| <b>Goal 1: Address South Africa's challenges through space services and production</b> | M1.1 The number of high-impact products and services  | M1.1 The number of high-impact applications  | 5                             | 4              | The indicator has been refined to reflect the applications developed by SANSA, as the products are also applications. The target has also been revised downwards due to budgetary constraints. |
|  | M1.2 The number of government decision or policy support tools                                      | Target no longer appears in the APP  | 2 policy tools for government | -              | This target can no longer be delivered due to budgetary constraints.   |
| <b>Goal 2: Lead high-impact collaborative R&amp;D on a national scale</b>              | M2.1 The national research productivity score for space supported R&D                               | M2.1 The national research productivity score for space supported R&D (This productivity score is based on a function of research funding sourced + publications (journals, books, reports, proceedings) + students graduated + research rating status.) (modification implemented in 2016/17) | 2000                          | 1300           | Given the fluctuation in publication rate and research funding, and the fact that this was a new score introduced with the new strategic plan, the original target was overestimated.          |
| <b>Goal 3: Develop national human capacity and ensure transformation</b>               | M3.1 The number of youth directly engaged through science awareness and outreach activities         | M3.1 The number of youth directly engaged  | 13500                         | 10800          | The target is reduced due to budgetary constraints.  |
|  | M3.2 The proportion of supported PDI students for formalised training                               | M3.2 The number of students and interns supported for formalised training  | 90                            | 50             | The target has been adjusted downwards due to budgetary constraints and available resources.   |
|  | M4.1.1. Successful satellite pass monitoring rate of 98% per year for Earth Observation by end 2020 | M4.1.1: Successful satellite pass monitoring rate for Earth Observation  | 99%                           | 98%            | The target is revised to reflect current realistic target within industry norm   |

| Strategic Goal   | Original   | Modification   | 2018/19 Original | 2018/19 Target  | Reason for Modification  |
|--|--|--|------------------|---|--|
| <b>Goal 4: Enhance the competitiveness of the South African space industry</b> | M4.1.2 Total commercial income of R267 million by year end March 2020  | M4.1.2 Total income generated from space operations activities                                   | R69 million      | R58 million   | The target is revised based on current firm and anticipated contracts  |
|  | M4.1.3 The proportion of space operations commercial international income invested in other SANSA programmes | Target has been removed  | R13 million      | -   | Target has been removed, as it is reliant on M4.1.2 and can be considered as double counting.  |
|  | M4.2.1 A total of 55 direct jobs supported per year externally through SANSA programme contracting           | M4.2.1 The number of direct jobs supported externally through SANSA programme contracting        | 100              | 55  | Modification implemented in 2017/18 to a more realistic target as jobs supported are based on current funding levels for the satellite programme |
|  | M4.2.2 The achievement of key project milestones in the EO-Sat1 development                                  | M4.2.2 The progress status on the EO-Sat1 development project                                    | 100%             | 70%<br>Critical Design Review (CDR) completed for the Space System Flight Model | Target has been modified to capture realistic progress due to budgetary constraints  |
|  | 4.2.3 The total contract expenditure to SMEs for core space projects   | 4.2.3 The total contract expenditure to SMEs for core space projects                             | R15 million      | R11.9 million   | Target has been revised downwards based on current firm and anticipated contracts  |
|  | 4.2.4 The total contract expenditure to the broad space related industry for core space projects             | 4.2.4 The total contract expenditure to the broad space related industry for core space projects | R67 million      | R50 million   | Target has been revised downwards based on current firm and anticipated contracts  |
|  | -  | 4.2.5 The progress status on the CubeSat development   | -                | 100%<br>Completion of qualification and flight                                  | This is a new target to capture the developments on the CubeSat programme  |

| Strategic Goal  | Original   | Modification   | 2018/19 Original                   | 2018/19 Target                    | Reason for Modification  |
|---|--|--|------------------------------------|-----------------------------------|--|
|   |  |  |                                    | models, and launch and commission |  |
| <b>Goal 5: Develop active global partnerships</b>             | M5.1 The equivalent revenue generated through partnerships as a proportion of the SANSA non-commercial operating revenue | Target has been removed  | 8%                                 | -                                 | This target has been removed, as SANSA should not be raising funds as a Schedule 3A entity |
|   | -  | M5.1.1 Number of active overseas partnerships                    | -                                  | 5                                 | This is a new indicator to capture SANSA's international partnerships                      |
|   | -  | M5.1.2 Number of active African partnerships                     | -                                  | 5                                 | This is a new indicator to capture SANSA's African partnerships                            |
|   | -  | M5.1.3 Number of active national partnerships                    | -                                  | 5                                 | This is a new indicator to capture SANSA's national partnerships                           |
| <b>Goal 6: Ensure the growth and sustainability of SANSA</b>  | M6.1 Total non-ringfenced SANSA revenue  | Strategic outcome-oriented Goal and indicators have been removed | R251 million                       | -                                 | This target has been removed, as it is an operational target                               |
|   | M6.2 Estimated monetised impact of space related activities  |  | R130 million                       | -                                 | This target has been removed, as it is an operational target                               |
|   | M6.3 SANSA's stakeholder awareness   |  | 70%                                | -                                 | This target has been removed, as it is an operational target                               |
|   | M6.4 High-level NSP implementation progress status   |  | 60% of the NSP projects are active | -                                 | This target has been removed, as it is an operational target                               |
| <b>Goal 7: Transform SANSA into a high-performance Agency</b> | M7.1 Implementation of identified initiatives that enhance organisational performance                                    | Strategic outcome-oriented Goal and indicators have been removed | 4                                  | -                                 | This target has been removed, as it is an operational target                               |

| Strategic Goal | Original  | Modification | 2018/19 Original   | 2018/19 Target | Reason for Modification                                      |
|----------------|---|--------------|--|----------------|--|
|                | M.7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades                            | -            | T.7.2 65% Proportional (%) representation of permanent staff from designated groups in the D to F grades or top two Management Levels by end March 202 | -              | This target has been removed, as it is an operational target |
|                | M.7.31% of investment into staff training & development against operating expenditure. (modification to be implemented 2017/18) |              | 1%   | -              | This target has been removed, as it is an operational target |

## KEY PERFORMANCE INDICATORS

|        |  |
|--------|--|
| M1.1   | Number of youth directly engaged   |
| M2.1   | The national research productivity score for space supported R&D                           |
| M3.1   | The number of youth directly engaged   |
| M3.2   | The number of students and interns supported for formalised training                       |
| M4.1.1 | Successful satellite pass monitoring rate for Earth observation                            |
| M4.1.2 | Total income generated from space operations activities                                    |
| M4.2.1 | The number of direct jobs supported externally through SANSA programme contracting         |
| M4.2.2 | The progress status on the EOSat1 developments   |
| M4.2.3 | The total contract expenditure to SMEs for core space projects                             |
| M4.2.4 | The total contract expenditure to the broad space related industry for core space projects |
| M4.2.5 | The progress status on the CubeSat developments  |
| M5.1.1 | The number of active formal overseas partnerships  |
| M5.1.2 | The number of active formal African partnerships   |
| M5.1.3 | The number of active formal national partnerships  |



| Indicator title                                | Name of Indicator  |
|--|--|
| <b>Short definition</b>                        | Provides a brief explanation of what the indicator is, with enough detail to give a general understanding of the indicator   |
| <b>Purpose/importance</b>                      | Explains what the indicator is intended to show and why it is important.   |
| <b>Source/collection of data</b>               | 1. A description of <b>what source documentation or information</b> is used as a basis for actual performance achievements.<br>2. A description <b>where this source documentation or information originates from</b> – by indicating name of responsible unit, person, etc.   |
| <b>Method of calculation</b>                   | Describes clearly and specifically how the indicator is calculated.  |
| <b>System Used</b>                             | Indicate the name of the system used to process the performance information and indicate whether this system is electronic or manual in nature   |
| <b>Description of KPI reporting activities</b> | 1. Describe the reporting activities per indicator by indicating the name of the report, frequency of reporting and to which level<br>2. Indicate where this output document or report originates from by referring to responsible person, supporting info and standard reporting requirements<br>3. Document the related control activities relevant to outputs/reporting |
| <b>Means of Validation</b>                     | Describes clearly and specifically how the indicator is validated  |
| <b>Data limitations</b>                        | Identifies any limitation with the indicator data, including factors that might be beyond the directorates control   |
| <b>Type of indicator</b>                       | Identifies whether the indicator is measuring inputs, activities, outputs, outcomes or impact, or equity   |
| <b>Calculation type</b>                        | Identifies whether the reported performance is cumulative, or non-cumulative   |
| <b>Reporting cycle</b>                         | Identifies if an indicator is reported quarterly, annually or at longer time intervals   |
| <b>New indicator</b>                           | Identifies whether the indicator is new, has significantly changed, or continues without change from the previous year   |
| <b>Desired SANSa performance</b>               | Identifies whether actual performance that is higher or lower than targeted performance is desirable   |
| <b>Desired Divisional performance</b>          | Identifies whether actual performance that is higher or lower than targeted performance is desirable per division.   |
| <b>Indicator responsibility</b>                | Identifies who is responsible for managing and reporting the indicator   |

| Indicator title                         | M1.1 Number of national high- impact applications  |
|---|--|
| Short definition                        | The number of high-impact products/services (PS) delivered within any one of the following PS areas, (i) PS1 - 50 000 images distributed, (ii) PS2 - Five thematic categories for national base datasets, (iii) PS3 - Space weather products and services, (iv) PS4 - Magnetic technology products and services.   |
| Purpose/importance                      | This is intended to demonstrate a sample of the products, services and applications that are impactful and delivered utilising EO and space science know how, expertise and facilities.  |
| Source/collection of data               | <p>Reports that document what has been achieved or produced including appropriate statistics for each product. Some of the specifics may include some or all of the following:</p> <p><b>PS1 – 50 000 images distributed</b></p> <p><b>PS2 – Five thematic categories for national base datasets</b></p> <p><b>PS3 – Space weather products and services</b></p> <ul style="list-style-type: none"> <li>• HF Propagation Prediction Services</li> <li>• Space Weather Bulletins &amp; Alerts</li> <li>• Space Weather Course</li> <li>• Space Weather Support Tools</li> </ul> <p><b>PS4 – Magnetic Technology products and services</b></p> <ul style="list-style-type: none"> <li>• Compass Calibrations</li> <li>• Magnetic Navigation Ground Support Services</li> <li>• Magnetic Field Model Maps</li> <li>• Magnetic Sensor Sourcing</li> <li>• Magnetic Technology related Courses</li> </ul> |
| Method of calculation                   | A brief qualitative report of the services/products that have been delivered under these categories will be used as the products/services are not a simple statistical/numerical activity.   |
| System Used                             | Manual   |
| Description of KPI reporting activities | Compilation of detailed products/service reports. Recording of any activities, events, that can be used for validation e.g. data transmission logs, client acceptance signatures, contract registers, progress reports.  |
| Means of Validation                     | Sample testing some of the assertions in the Product/Service report against some of the validation material e.g. data transmission logs, client acceptance signatures, contract registers, progress reports.   |
| Data limitations                        | Some of the meaningful activities cannot be necessarily independently validated. This KPI is intended to progressively concretise the SANSA product/service portfolio and to quantify its impact.  |
| Type of indicator                       | Output and impact/ Progressive qualitative   |
| Calculation type                        | Cumulative and progressive throughout the year.  |
| Reporting cycle                         | Quarterly  |
| New indicator                           | No   |
| Desired SANSA performance               | Deliver all four products/services as per APP  |
| Desired Divisional performance          | Earth Observation: Deliver two high-impact products/services<br>Space Science: Deliver two high-impact products/services   |
| Executive responsible                   | MD: EO & MD: SS  |
| Portfolio Responsibility                | Earth Observation: DPS & DSM<br>Space Science: AST & SRA   |

| <b>Indicator title</b>                         | <b>M2.1 The national research productivity score for space supported R&amp;D</b>   |
|--|--|
| <b>Short definition</b>                        | The research productivity score for R&D  |
| <b>Purpose/importance</b>                      | This is meant to demonstrate SANSA's research output and is an indicator of research output, quality, impact and relevance   |
| <b>Source/collection of data</b>               | <p>This productivity score is based on a function of research funding sourced + publications (journals, books, reports, proceedings) + students graduated + research rating status</p> <ol style="list-style-type: none"> <li>1. Published papers in PDF and hard copy available. For books Front pages available in pdf. Calculated with impact factor and author position.</li> <li>2. Grant funding listed in grant award registers, and award letters available - also available from finance system as grant income received, copy of register from NRF or international system indicating payments received for that year up to end of quarter. Only grant funding for research projects or grant holder linked student funding should be included – no independent student (PDP) or post doc or science advancement funding. Research funding from all sources should be included.</li> <li>3. Students graduated – list is maintained with PDF copies of Degree certificates or award letters.</li> <li>4. Research rating status – determined by rating award letters (only counted on renewal or first time achievement of rating).</li> </ol> |
| <b>Method of calculation</b>                   | Composite function as described in “determination of research productivity score” document   |
| <b>System Used</b>                             | Manual, Excel spreadsheet  |
| <b>Description of KPI reporting activities</b> | Information is collected monthly on an ongoing basis, and collated and verified quarterly.   |
| <b>Means of Validation</b>                     | <ul style="list-style-type: none"> <li>▪ Count the hard copies of publications and books</li> <li>▪ Verify that evidence exists for all aspects included in the formula</li> <li>▪ Verify excel sheet with calculation</li> </ul>  |
| <b>Data limitations</b>                        | A composite score masks some of the key elements that are, in their own right, important for SANSA performance review e.g. number of publications, grant amount raised, number of graduates, number of rated researchers and their ratings. Therefore, it is important that data on these base elements is also kept and reported on in the main narrative of the report.  |
| <b>Type of indicator</b>                       | Output   |
| <b>Calculation type</b>                        | Cumulative   |
| <b>Reporting cycle</b>                         | Quarterly  |
| <b>New indicator</b>                           | No   |
| <b>Desired SANSA performance</b>               | Achieve a research productivity score of 1300  |
| <b>Desired Divisional performance</b>          | <p>Earth Observation: Research productivity score contribution of 300 to the total SANSA score</p> <p>Space Science: Research productivity score contribution of 1000 to the total SANSA score</p>   |
| <b>Executive responsible</b>                   | MD: EO & MD: SS  |
| <b>Portfolio Responsibility</b>                | <p>Earth Observation: RAD Manager</p> <p>Space Science: SRA Manager</p>  |

| Indicator title                                | <b>M3.1 Number of youth directly engaged</b>   |
|--|--|
| <b>Short definition</b>                        | This refers to the number of young people engaged directly through some specific activity (e.g. visit by learners to a SANSA facility, learner workshop/lesson, SANSA visit to a school) and <b>will exclude a count of young people who visit SANSA stands at exhibits.</b> |
| <b>Purpose/importance</b>                      | To indicate the extent to which SANSA is promoting science and increasing awareness amongst young people   |
| <b>Source/collection of data</b>               | Hard copies of attendance register of activities<br>PDF of attendance registers and summary.   |
| <b>Method of calculation</b>                   | Manual calculation   |
| <b>System Used</b>                             | Manual System  |
| <b>Description of KPI reporting activities</b> | 1. Attendance register is completed at the event and signed by external supervisor of the participating group.<br>2. Number of attendees get captured into excel spread sheet  |
| <b>Means of Validation</b>                     | Signed-off attendance registers  |
| <b>Data limitations</b>                        | Omission of full details on register. Data would not reflect some of the demographics (race, gender) required by the PPC for example.  |
| <b>Type of indicator</b>                       | Output   |
| <b>Calculation type</b>                        | Cumulative   |
| <b>Reporting cycle</b>                         | Quarterly  |
| <b>New indicator</b>                           | No   |
| <b>Desired SANSA performance</b>               | Engage 10800   |
| <b>Desired Divisional performance</b>          | Earth Observation: Engage 50% of total learners - 5400<br>Space Science: Engage 50% of total learners - 5400   |
| <b>Executive responsible</b>                   | MD: SS; EO;  |
| <b>Portfolio Responsibility</b>                | Space Science: SAU Manager<br>Earth Observation: SAU Manager   |

| Indicator title                                | <b>M3.2 Number of students and interns supported for formalised training</b>   |
|--|--|
| <b>Short definition</b>                        | The total number of students currently linked and supported by SANSA through bursaries or supervised. This includes interns currently supported through SANSA workplace initiatives irrespective of how their salaries are funded. <b>SANSA employees who are supported under any SANSA staff development scheme should not be counted. Further this excludes short courses and focuses on students that are registered for some formal training for a degree, diploma, or certificate within the South African National Qualification Framework.</b>  |
| <b>Purpose/importance</b>                      | This measures the level to which SANSA contributes to the development of external human capacity through formal degree training and internships.   |
| <b>Source/collection of data</b>               | Contracts and student agreements & student records<br>Proof of supervision engagement<br>Internship award letters or other documentation   |
| <b>Method of calculation</b>                   | Manual head count. Since the academic year and financial year are different – students are added in the quarter in which they joined SANSA for that financial year. <b>That is, students have to be counted once per annum in the quarter in which they joined or began to be supported by SANSA.</b> To simplify students will not be counted in quarter 4, however, all supported students will be counted in quarter 1 (April) for the new financial and academic year. Thereafter, only new students who have joined after June will be counted in Q2 and Q3. Interns will be counted in the year that they are supported and only once per contract year (so each intern should be counted for the 1 year that they are supported). |
| <b>System Used</b>                             | Excel Spreadsheet  |
| <b>Description of KPI reporting activities</b> | All student contracts and other relevant documentation counted   |
| <b>Means of Validation</b>                     | Contracts and student agreements, proof of student supervision contracts/register are available. Proof of internships.   |
| <b>Data limitations</b>                        | There is no distinction between students; the level of training is not indicated. Therefore, it is important that data on the level of training and the successful graduates is also kept and reported on in the main narrative of the report.   |
| <b>Type of indicator</b>                       | Output   |
| <b>Calculation type</b>                        | Cumulative – proportion should be calculated SANSA wide  |
| <b>Reporting cycle</b>                         | Quarterly  |
| <b>New indicator</b>                           | No   |
| <b>Desired SANSA performance</b>               | Target of 50 students and interns;   |
| <b>Desired Divisional performance</b>          | Earth Observation: 15<br>Space Science: 20<br>Space Engineering: 15  |
| <b>Executive responsible</b>                   | ED: SP, MD: EO, MD: SS   |
| <b>Portfolio Responsibility</b>                | SANSA Student Administrator  |

| Indicator title                                | M4.1.1. Successful satellite pass monitoring rate for Earth Observation  |
|--|--|
| <b>Short definition</b>                        | The measurement of the rate of success in downloading SANSA EO data measured in proportional time achieved.  |
| <b>Purpose/importance</b>                      | To measure the success rate of the SANSA Space Operations in supporting SANSA Earth Observation. It is important to measure the effectiveness of this support given the internal contracting for these services between the two directorates. It also shows the impact of SANSA's space operations activities to EO. |
| <b>Source/collection of data</b>               | <ol style="list-style-type: none"> <li>1. Data acquired is calculated minutes of a pass or a fraction thereof.</li> <li>2. Data losses are calculated in minutes or fractions thereof</li> <li>3. Operational workload is calculated in passes per day</li> </ol>  |
| <b>Method of calculation</b>                   | Systematic Count of minutes of data captured and demodulated   |
| <b>System Used</b>                             | Daily passes requested from EO as per flight plan, SO data acquisition pass summary from QF and database entries   |
| <b>Description of KPI reporting activities</b> | <ol style="list-style-type: none"> <li>1. Operations manager totals the minutes from passes completed</li> <li>2. Operations manager completes KPI quarterly</li> </ol>  |
| <b>Means of Validation</b>                     | SO verifies with EO on quantity (minutes) and quality of data acquired   |
| <b>Data limitations</b>                        |  |
| <b>Type of indicator</b>                       | Output   |
| <b>Calculation type</b>                        | Non-accumulative   |
| <b>Reporting cycle</b>                         | Quarterly  |
| <b>New indicator</b>                           | Not a new indicator  |
| <b>Desired SANSA performance</b>               | =>98%  |
| <b>Desired Divisional performance</b>          | 98 %   |
| <b>Executive responsible</b>                   | MD: SO   |
| <b>Portfolio Responsible</b>                   | Space Operations: Operations manager   |

| <b>Indicator title</b>                         | <b>M4.1.2.Total income generated from space operations activities</b>  |
|--|--|
| <b>Short definition</b>                        | The income generated by the Space Operations Programme for the financial year, includes all forms of income e.g. inter-company contractual revenue, external contracts, ring fenced grant income.  |
| <b>Purpose/importance</b>                      | This measures the revenue generation capacity of the Space Operations activities. This is important given the commercial emphasis of this programme.   |
| <b>Source/collection of data</b>               | This information is based on signed contracts and the actual financial transactions on the financial system and reported numbers on the financial statements.  |
| <b>Method of calculation</b>                   | This would be the total of all the contractual revenue generated under the space operations programme.   |
| <b>System Used</b>                             | Financial systems  |
| <b>Description of KPI reporting activities</b> | Generate income financial statement from the ERP system<br>Cross reference with contracts received & invoices issued & grant awards<br>Cross reference with income contract spreadsheets (Marketometer)  |
| <b>Means of Validation</b>                     | Contracts with the clients and invoices  |
| <b>Data limitations</b>                        | The value does not give an indication of the different sector income streams. Such information would give SANSA the necessary intelligence for making strategic choices. Therefore, information on the different income streams should be kept and reported in the report narrative. |
| <b>Type of indicator</b>                       | Output   |
| <b>Calculation type</b>                        | Cumulative   |
| <b>Reporting cycle</b>                         | Annually   |
| <b>New indicator</b>                           | Yes  |
| <b>Desired SANSA performance</b>               | Target of R58 million  |
| <b>Desired Divisional performance</b>          | Target of R58 million  |
| <b>Executive responsible</b>                   | MD: SO   |
| <b>Portfolio Responsibility</b>                | Space Operations: Finance manager / and Business Developer   |

| Indicator title                                | <b>M4.2.1. The number of direct jobs supported externally through SANSa programme contracting</b>   |
|--|---|
| <b>Short definition</b>                        | Number of personnel employed full time on the EO-Sat1 Programme, Cube Sat programme or any other equipment or instrumentation build programme either by the main contractor or subcontractors funded through SANSa.   |
| <b>Purpose/importance</b>                      | Indicates the number of opportunities being offered to the space industry in the country. One of the objectives of the Economic Competitiveness Support Programme (ECSP) is to create jobs. However, SANSa outsources the bulk of the work in line with government's decision that the satellite build programme should be done in partnership with Denel. Further, the SANSa Act mandates SANSa to stimulate the national space industry. Therefore, this KPI measures the extent to which these two objectives are met. |
| <b>Source/collection of data</b>               | Signed reports issued by the contractors to whom the work is contracted.  |
| <b>Method of calculation</b>                   | Summation of all the jobs being occupied by contractor and subcontractor personnel on this Programme  |
| <b>System Used</b>                             | Manual  |
| <b>Description of KPI reporting activities</b> | Now, a single report exists: "Industry Development & Localization Management Plan", by Denel Dynamics, from where the information is extracted<br>This report is issued quarterly   |
| <b>Means of Validation</b>                     | Verification of information with the main contractor/subcontractor on a regular basis   |
| <b>Data limitations</b>                        | Given that some of the external employees do not solely focus on the SANSa contracted programmes, a more accurate count is not employee numbers but rather employee Full Time Equivalents (FTE). Therefore, going forward SANSa has to find ways of refining this metric.<br>Currently this KPI does not measure employee demographics which information is required by the DST and the PPC. Therefore, this information has to be collected and recorded and presented in the narrative of the report.                   |
| <b>Type of indicator</b>                       | Output  |
| <b>Calculation type</b>                        | Cumulative  |
| <b>Reporting cycle</b>                         | Annually  |
| <b>New indicator</b>                           | No  |
| <b>Desired SANSa performance</b>               | Total of 55 jobs supported  |
| <b>Desired Divisional performance</b>          | SPD: 55 jobs supported  |
| <b>Executive responsible</b>                   | ED: SPD   |
| <b>Portfolio Responsible</b>                   | Space Programme manager<br>Cube Sat – Programme coordinator<br>Any other designated project coordinators  |



| Indicator title                                | M4.2.2. The progress status on the EO-Sat1 development  |
|--|---|
| <b>Short definition</b>                        | This indicator establishes the technical progress accomplished when compared to the full development cycle and schedule of the project  |
| <b>Purpose/importance</b>                      | This is to measure the progress that is being made in the development of EO-Sat1 and allow for any remedial actions to be taken proactively to ensure the timely completion of the project.   |
| <b>Source/collection of data</b>               | Original programme schedule and latest programme schedule. Tracking of progress against key milestones.   |
| <b>Method of calculation</b>                   | Compare the date originally planned for a future programme review against the presently planned date, and calculate the difference, establishing then if the programme is delayed or if it is ahead of time. The progress is made measured on Key defining points (e.g. PDR, CDR,QAR,FAR) as planned, |
| <b>System Used</b>                             | Manual  |
| <b>Description of KPI reporting activities</b> | An “EO-Sat1 Programme/Project Progress Report” is produced quarterly. This report is summarised to represent the important events of the last quarter and presented to the Board Strategy and Investment Committee Meeting. Once approved, the report is then escalated to the Board.                 |
| <b>Means of Validation</b>                     | Comparison of latest programme schedule against the original programme schedule   |
| <b>Data limitations</b>                        | The schedule is dependent on the availability of funds to execute the programme schedule.   |
| <b>Type of indicator</b>                       | Output: Measures scheduled performance  |
| <b>Calculation type</b>                        | Cumulative  |
| <b>Reporting cycle</b>                         | Annually  |
| <b>New indicator</b>                           | No – Established indicator  |
| <b>Desired SANSA performance</b>               | Critical Design Review(CDR) completed for the Space System flight model 2018/19   |
| <b>Desired Divisional performance</b>          | As Above  |
| <b>Executive responsible</b>                   | ED: SP  |
| <b>Portfolio Responsibility</b>                | SPD: Project Manager  |

| Indicator title                                | <b>M4.2.3. The total contract expenditure to SME's for core space projects</b>  |
|--|---|
| <b>Short definition</b>                        | The KPI measures the contract value that is outsourced to <b>Small to Medium Enterprises (SMEs)</b> for all SANSAs programmes including EO, SS, SO and SE programmes, in the main SE. <b>This should include the component that Denel outsources to SMEs as part of the EO-Sat1 project. This should exclude the EO-Sat1 money spent within Denel. This should not include consultancy expenditure for general support initiatives. This should include direct support on the satellite development</b> |
| <b>Purpose/importance</b>                      | This measures the extent to which SANSAs is supporting SMEs through its core space projects.  |
| <b>Source/collection of data</b>               | Internal contracts and invoices and auditable reports from the supported companies, such as Denel.  |
| <b>Method of calculation</b>                   | Manual  |
| <b>System Used</b>                             | Contract register and financial system  |
| <b>Description of KPI reporting activities</b> | Quarterly   |
| <b>Means of Validation</b>                     | Invoices  |
| <b>Data limitations</b>                        | Accuracy in classifying which companies are SMEs and which are not. This information is dependent on the annual turnover of the relevant company and this information is not necessarily readily available.   |
| <b>Type of indicator</b>                       | Input   |
| <b>Calculation type</b>                        | Cumulative  |
| <b>Reporting cycle</b>                         | Annually  |
| <b>New indicator</b>                           | No  |
| <b>Desired SANSAs performance</b>              | A total of R 10 million to be outsourced to SMEs this financial year.   |
| <b>Desired Divisional performance</b>          | Space Engineering: R10 million<br>Earth Observation: R1,9 million   |
| <b>Executive responsible</b>                   | ED: SP; MD: EO  |
| <b>Portfolio Responsibility</b>                | Earth Observation: Stakeholder and Finance manager<br>Space Engineering: Space Programme Manager  |

|  |   |
|--|---|
| <b>Indicator title</b>                         | <b>M4.2.4. The total contract expenditure to the broad space related industry for core space projects</b>   |
| <b>Short definition</b>                        | The KPI measures the contract value that is outsourced to <b>Small to Medium Enterprises (SMEs) and big industry players. This is the total investment to date on the programme. (This should not include consultancy expenditure for general support initiatives).</b> |
| <b>Purpose/importance</b>                      | This is a true measure of the capital invested in re-establishing the space industry in South Africa  |
| <b>Source/collection of data</b>               | Internal contracts and invoices and auditable reports from affected companies.  |
| <b>Method of calculation</b>                   | Manual  |
| <b>System Used</b>                             | Contract register and financial system  |
| <b>Description of KPI reporting activities</b> | Quarterly: The Programme Manager must keep an updated account of all funds invested, per contract, in industry. This is to be reported in the quarterly report every quarter  |
| <b>Means of Validation</b>                     | Invoices and an extract from the financial management system on invoices paid   |
| <b>Data limitations</b>                        | SANSA can only report on the funds expended on Programmes under its control   |
| <b>Type of indicator</b>                       | Input: Broader impact on space industry   |
| <b>Calculation type</b>                        | Cumulative  |
| <b>Reporting cycle</b>                         | Quarterly   |
| <b>New indicator</b>                           | This is an existing but modified indicator  |
| <b>Desired SANSA performance</b>               | A total of R50 million to be contracted to the broader space industry this financial year.  |
| <b>Desired Divisional performance</b>          | As above  |
| <b>Executive responsible</b>                   | ED: SP  |
| <b>Portfolio Responsibility</b>                | Space Programme Manager SPD   |

| Indicator title                                | M4.2.5.The progress status on the CubeSat development  |
|--|--|
| <b>Short definition</b>                        | This indicator establishes the technical progress accomplished when compared to the full development cycle and schedule of the project   |
| <b>Purpose/importance</b>                      | This is to measure the progress that is being made in the development of Cube sat and allow for any remedial actions to be taken proactively to ensure the timely completion of the project.                           |
| <b>Source/collection of data</b>               | Original programme schedule and latest programme schedule. Tracking of progress against key milestones.  |
| <b>Method of calculation</b>                   | Compare the date originally planned for a future programme review against the presently planned date, and calculate the difference, establishing then if the programme is delayed or if it is ahead of time.           |
| <b>System Used</b>                             | Manual   |
| <b>Description of KPI reporting activities</b> | A quarterly report is summarised to represent the important events of the last quarter and presented to the Board Strategy and Investment Committee Meeting. Once approved, the report is then escalated to the Board. |
| <b>Means of Validation</b>                     | Comparison of latest programme schedule against the original programme schedule  |
| <b>Data limitations</b>                        | The schedule is dependent on the availability of funds to execute the programme schedule.  |
| <b>Type of indicator</b>                       | Output: Measures scheduled performance   |
| <b>Calculation type</b>                        | Cumulative   |
| <b>Reporting cycle</b>                         | Annually   |
| <b>New indicator</b>                           | No – Established indicator   |
| <b>Desired SANSA performance</b>               | Completion of the qualification phase and flight model phase, and Launch and commission.   |
| <b>Desired Divisional performance</b>          | Same as Above  |
| <b>Executive responsible</b>                   | ED Space Engineering   |
| <b>Portfolio Responsibility</b>                | Space Engineering Project Manager  |

| <b>Indicator title</b>                         | <b>M5.1.1. Number of active formal overseas partnerships</b>  |
|--|---|
| <b>Short definition</b>                        | This indicator is aimed at developing global space partnerships   |
| <b>Purpose/importance</b>                      | This is meant to leverage a significant benefit for the space programme through global partnerships   |
| <b>Source/collection of data</b>               | MoUs, Meeting minutes and Joint Project Reports   |
| <b>Method of calculation</b>                   | MoUs signed, meetings held and progress status on joint projects  |
| <b>System Used</b>                             | Manual  |
| <b>Description of KPI reporting activities</b> | A quarterly report is summarised to represent the important events of the last quarter and presented to the Executive Committee for approval. |
| <b>Means of Validation</b>                     | Approval of reports by EXCO   |
| <b>Data limitations</b>                        | Progress may be limited by the availability of funds to implement the resolutions of the MoUs   |
| <b>Type of indicator</b>                       | Activity  |
| <b>Calculation type</b>                        | Cumulative  |
| <b>Reporting cycle</b>                         | Annually  |
| <b>New indicator</b>                           | Yes   |
| <b>Desired SANSA performance</b>               | 5   |
| <b>Desired Divisional performance</b>          | EO - 2<br>SS – 2<br>SE - 1  |
| <b>Executive responsible</b>                   | MD Earth Observation, MD Space Science & MD Space Engineering   |
| <b>Portfolio Responsibility</b>                | SANSA Stakeholder Liaison Specialist  |

| <b>Indicator title</b>                         | <b>M5.1.2. Number of active formal African partnerships</b>  |
|--|--|
| <b>Short definition</b>                        | This indicator is aimed at developing African partnerships   |
| <b>Purpose/importance</b>                      | This is meant to leverage a significant benefit for the space programme through African partnerships                                     |
| <b>Source/collection of data</b>               | MoUs, Meeting minutes and Joint Project Reports  |
| <b>Method of calculation</b>                   | MoUs signed, meetings held and progress status on joint projects   |
| <b>System Used</b>                             | Manual   |
| <b>Description of KPI reporting activities</b> | A quarterly report is summarised to represent the important events of the last quarter and presented to the Executive Committee Meeting. |
| <b>Means of Validation</b>                     | Approval of reports by the EXCO  |
| <b>Data limitations</b>                        | Progress may be limited by the availability of funds to implement the resolutions of the MoUs  |
| <b>Type of indicator</b>                       | Activity   |
| <b>Calculation type</b>                        | Cumulative   |
| <b>Reporting cycle</b>                         | Annually   |
| <b>New indicator</b>                           | Yes  |
| <b>Desired SANSA performance</b>               | 5  |
| <b>Desired Divisional performance</b>          | EO - 2<br>SS – 2<br>SE - 1   |
| <b>Executive responsible</b>                   | MD Earth Observation, MD Space Science & MD Space Engineering  |
| <b>Portfolio Responsibility</b>                | SANSA Stakeholder Liaison Specialist   |

| <b>Indicator title</b>                         | <b>M5.1.3. Number of active formal national partnerships</b>   |
|--|--|
| <b>Short definition</b>                        | This indicator is aimed at establishing national partnerships with key stakeholders  |
| <b>Purpose/importance</b>                      | This is meant to leverage a significant benefit for the space programme through national partnerships                                    |
| <b>Source/collection of data</b>               | MoUs, Meeting minutes and Joint Project Reports  |
| <b>Method of calculation</b>                   | MoUs signed, meetings held and progress status on joint projects   |
| <b>System Used</b>                             | Manual   |
| <b>Description of KPI reporting activities</b> | A quarterly report is summarised to represent the important events of the last quarter and presented to the Executive Committee Meeting. |
| <b>Means of Validation</b>                     | Approval of reports by the SANSA EXCO  |
| <b>Data limitations</b>                        | Progress may be limited by the availability of funds to implement the resolutions of the MoUs  |
| <b>Type of indicator</b>                       | Activity   |
| <b>Calculation type</b>                        | Cumulative   |
| <b>Reporting cycle</b>                         | Annually   |
| <b>New indicator</b>                           | Yes  |
| <b>Desired SANSA performance</b>               | 5  |
| <b>Desired Divisional performance</b>          | EO - 2<br>SS - 2<br>SE - 1   |
| <b>Executive responsible</b>                   | MD Earth Observation, MD Space Science & MD Space Engineering  |
| <b>Portfolio Responsibility</b>                | SANSA Stakeholder Liaison Specialist   |

## REFERENCES

1. Science Councils and NSI Reports
2. South African Government Reports and Plans
3. <http://www.sia.org/annual-state-of-the-satellite-industry-reports/2014-sia-state-of-satellite-industry-report/>
4. State of the Satellite Industry Report September 2016: Satellite Industry Association ([www.sia.org](http://www.sia.org)) and Bryce Space and Technology (brycetek.com)