



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



Annual Performance Plan 2022-23

South African National Space Agency

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ACCOUNTING AUTHORITY STATEMENT

The Department of Science and Innovation (DSI) has prioritised the transformation of the Science Technology and Innovation (STI) landscape in South Africa to ensure even greater support and output for the sustainability of technological advancement in the country. The South African National Space Agency (SANSA) has aligned its priorities for the 2022-2023 financial year with DSI and national strategic priorities to ensure the greater integration for space products, services, and applications across government for the benefit of all South Africans.

The work of the South African National Space Agency (SANSA) during the 2020-2025 five-year term is to be guided by a vision of *“an integrated National Space Capability that responds to socio-economic challenges in Africa by 2030”*. This vision is critical for steering the Agency towards the achievement of its strategic outcomes and stimulating an enabling environment for the development of local space capacity through support interventions to the broader space sector.

The 2022-2023 period will be the third year of implementing the current SANSA strategy, which has marked the beginning of a new trajectory for the Agency towards the following primary objectives as provided by the South African National Space Agency Act:

- 1) Promoting the peaceful use of outer space.
- 2) Supporting the creation of an environment conducive to industrial development in space technology.
- 3) Fostering research in space science, communications, navigation, and space physics.
- 4) Advancing scientific, engineering, and technological competencies and capabilities through human capital development outreach programmes and infrastructure development.
- 5) Fostering international cooperation in space-related activities.

The development of the new SANSA strategy at a time when the global Covid-19 pandemic was threatening the economic stability of South Africa and the world at large, necessitated that the Agency should review its developmental approach in line with key priorities of government as outlined in the National Development Plan (NDP), 2019 – 2024 Medium Term Strategic Framework (MTSF), Department of Science and Innovation (DSI) 2019 White Paper on Science, Technology and Innovation (STI), National Space Strategy (NSS), South African Earth Observation Systems Strategy (SAEOSS) and other relevant strategies and policies of government.

Key priorities for the 2022-2023 financial year are, therefore, underpinned by the Agency’s agenda to transform the space industry in accordance with its strategic outcomes, national policy initiatives, and priorities of the DSI. During this period SANSA will continue to work closely with government departments to ensure 80% of government departments and public entities are utilising space products and services by the end of the five-year term of the implementation of SANSA’s strategy.

The Agency’s performance targets for 2022-2023 remain conservatively aligned to the limited financial resource pool placed at SANSA’s disposal through budgetary allocations. Strategic alliances with stakeholders across the country, continent, and internationally will be central to resource mobilisation and developmental efforts to enable the Agency to deliver on its mandate, the National Space Strategy, and the South African Earth Observation Systems Strategy.

Concerted efforts towards positioning the local space sector to deliver on a regional and continental space agenda in accordance with initiatives to formalise the SADC and African space programmes will also remain a priority.

The Board and management of SANSa remain committed to repositioning SANSa to support a new growth trajectory for the sector through a more outcome-based approach, as this would strengthen the Agency's capacity to develop the local space landscape and we acknowledge the continuous support of the Executive Authority in this regard.

To increase its impact in the local and African space sector, SANSa will strengthen collaborations with its end user base, in order to maximise the use of space products and services across all tiers of government, both nationally and across the continent.

The SANSa Board endorses this 2022/2023 Annual Performance Plan and pledges its commitment towards ensuring the achievement of all planned key interventions for the financial year ahead.



Ms Xoliswa Kakana

Chairperson of the SANSa Board (Accounting Authority)

CHIEF EXECUTIVE OFFICER STATEMENT

The South African National Space Agency (SANSa) Mission is

“To provide leadership in unlocking the potential of space for the advancement and benefit of humanity”.

In accordance with this mission, SANSa will continue to pursue the following functions in line with its legislative mandate during the 2022-2023 financial period:

- 1) Implement any space programme in line with the policy determined in terms of the Space Affairs Act.
- 2) Advise the Minister on the development of national space science and technology strategies and programmes.
- 3) Implement any national space science and technology strategy.
- 4) Acquire, assimilate, and disseminate space satellite imagery for any organ of State.

The DSI is currently finalising the Decadal Plan for Science and Innovation following closely on the development of the 2019 White Paper on Science, Technology, and Innovation. Both these instruments of the DSI clearly denote the national priorities by government towards utilising science, technology, and innovation to address the challenges facing society.

As society is currently facing numerous global challenges environmentally and socially, the need for a structured system of innovation is critical to identify solutions needed to ensure we are able to meet the demands for food security, security and safety, and economic growth, amongst others.

As informed by the national 2019-2024 MTSF strategic priorities and strategic outcomes of the DSI as provided in the Department’s 2020-2025 Strategic Plan, the Agency has identified six key outcomes in its 2020-2025 Strategic Plan to move towards stimulating a capable and globally competitive South African space sector and these will be central to the implementation of this 2022-2023 Annual Performance Plan (APP):

- 1) **Outcome 1:** Increased space relevant knowledge that supports the developmental agenda.
- 2) **Outcome 2:** Stimulated and growing, inclusive space sector.
- 3) **Outcome 3:** Increased human capacity for the implementation of key space initiatives.
- 4) **Outcome 4:** SANSa positioned as a key enabler for the implementation of government’s space-related policies.
- 5) **Outcome 5:** Enabling infrastructure developed and upgraded to support the space sector value chain
- 6) **Outcome 6:** Increased participation of the national space programme in the regional and global space market

The Agency set several performance targets for the 2020-2021 financial year, 82% of which were achieved or exceeded. SANSa's consistency in terms of exceptional performance outcomes during the 2015-2020 five-year cycle, together with its unqualified external audit outcomes are demonstrative of a solid internal control environment and a stable organisation focused on its mandate of developing a capable local space sector.

To ensure SANSa becomes more responsive to the needs of the end users of space-related products and services, the Agency identified the following key interventions during the 2021-2022 financial year (i) a business model exercise; (ii) an organisational culture change initiative; and (iii) an institutional review, with a view of ensuring efficiencies, effectiveness, and relevancy. These interventions are critical for positioning SANSa at the core of local space programmes and will strengthen its capability to have a greater impact in terms of promoting the growth of the local space sector in the 2021-2022 financial year and beyond.

During the 2022-2023 financial year, key priorities will thus include the building of adequate space capacity; improvement of geospatial information; development of key infrastructure in support of the sector; and the provision of technical skills interventions, research capacity and knowledge management tools. The pursuit of research and development (R&D) programmes remains aligned to the White Paper on Science, Technology and Innovation, and strategic partnerships in the space sector will enhance SANSa's capacity to implement key programmes during the financial year.

Other key interventions, such as space infrastructure development; support to students and interns through formalised training; facilitating the creation of products and applications to address society's needs and challenges; leveraging on national, African, and international partnerships to ensure benefit for the South African Space Programme; as well as increasing the percentage of government departments and public entities that use geospatial information through space products and services will remain as key priorities for SANSa during 2022-2023.

As was the case during the 2021-2022 financial year, planning for the 2022-2023 performance cycle has been undertaken in the face of significant financial constraints for SANSa and the public service at large due to the impact of the Covid-19 pandemic. The Agency thus continues to focus on resource mobilisation in order to ensure optimal use of its limited resource pool for the benefit of the South African space sector.

The continued management focus on the rollout of identified key initiatives to transform SANSa into a high-performing agency during the coming financial year will also develop the organisation into one that is more efficient, resilient, fit-for-purpose, and capable of promoting a higher degree of development within the South African space sector.

The SANSa team will put the necessary measures in place for the achievement of performance targets as provided in this APP, and we rely on the usual support from the Board, Shareholder, and other key stakeholders to make this goal a reality.



Dr Valanathan Munsami

Chief Executive Officer

OFFICIAL SIGN-OFF

It is hereby certified that this Annual Performance Plan for the South African National Space Agency:

- 1) Was developed by the management team of the South African National Space Agency under the guidance of the Department of Science and Innovation (DSI).
- 2) Takes into account all the relevant policies, legislation, and other mandates for which the South African National Space Agency is responsible; and
- 3) Accurately reflects the outcomes and outputs which the South African National Space Agency will endeavour to achieve over the 2022/23 period



Ms Andiswa Mlisa
MD: Earth Observation

20 January 2022

Date



Mr Raoul Hodges
MD: Space Operations

20 January 2022

Date



Dr Lee-Anne McKinnell
MD: Space Science

20 January 2022

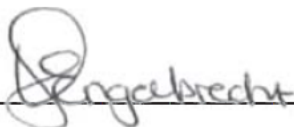
Date



Mr Amal Khatri
ED: Space Engineering

2022-01-20

Date



Ms Leonie Engelbrecht
Acting Chief Financial Officer

20 January 2022

Date



20 January 2022

Dr Valanathan Munsami

Chief Executive Officer



Date

20 January 2022

Mr Xoliswa Kakana

Chairperson of SANSA Board

(Accounting Authority)

Date

APPROVED BY:



10/03/2022

Dr BE Nzimande, MP

Minister of Higher Education, Science and Innovation

(Executive Authority)

Date

ABBREVIATIONS AND ACRONYMS

AfriGEO	African Group on Earth Observations
AIT	Assembly Integration and Testing
APP	Annual Performance Plan
ARMC	African Resource Management Constellation
B-BBEE	Broad-Based Black Economic Empowerment
BRICS	Brazil, Russia, India, China, and South Africa
CDF	Concurrent Design Facility
CEF	Concurrent Engineering Facility
CEOS	Committee on Earth Observation Satellites
COSPAR	Committee on Space Research
Covid-19	Coronavirus Disease 2019
CPI	Consumer Price Index
DCDT	Department of Communications and Digital Technologies
DDM	District Delivery Model
DESA	Digital Earth South Africa
DHET	Department of Higher Education and Training
DoT	Department of Transport
DSI	Department of Science and Innovation
dtic	Department of Trade, Industry and Competition
ED	Executive Director
EIA	Environmental Impact Assessment
EISCAT	European Incoherent Scatter Scientific Association
EO	Earth Observation
EODC	Earth observation Data Centre
ERRP	Economic Reconstruction and Recovery Plan
EXCO	Executive Committee / Executive Council
GEO	Group on Earth Observations
GIC	Geomagnetically Induced Current
GNSS	Global Navigation Satellite Services
GPS	Global Positioning System
GEO	Group on Earth Observations
GNSS	Global Navigation Satellite System
GTAC	Government Technical Advisory Centre

HESTIIL	Higher Education, Science, Technology, and Innovation Institutional Landscape
HF	High Frequency
ICAO	International Civil Aviation Organisation
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communications Technology
IMF	International Monetary Fund
IP	Intellectual Property
ISES	International Space Environment Service
LEO	Low Earth Orbit
LEO SAR	Low Earth Orbiting Satellite Aperture Radar
MD	Managing Director
MRD	Mission Requirements Document
MTEF	Medium-Term Expenditure Framework
MTSF	Medium-Term Strategic Framework
NASA	National Aeronautics and Space Administration
NDP	National Development Plan
NEPAD	New Partnership for Africa’s Development
NGO	Non-governmental Organisation
NRF	National Research Foundation
NSI	National System of Innovation
NSP	National Space Programme
NSS	National Space Strategy
NT	National Treasury
OECD	Organisation for Economic Co-operation and Development
OSR	Optical Space Research Laboratory
PDR	Preliminary Design Review
PFMA	Public Finance Management Act, (Act No. 1 of 1999), (as amended by Act No. 29 of 1999)
PICC	Presidential Infrastructure Coordinating Commission
PS	Products and Services
PWD(s)	People With Disability/ies
R&D	Research and Development
RDI	Research, Development and Innovation
SBAS	Satellite-Based Augmentation Systems
SADC	Southern African Development Community

SAEOSS	South African Earth Observation Systems Strategy
SANSA	South African National Space Agency
SBAS	Satellite-based Augmentation System
SCAR	Scientific Committee on Antarctic Research
SCM	Supply Chain Management
SDG	Sustainable Development Goal
SDR	Software Defined Radio
SE	Space Engineering
SET	Science, Engineering, and Technology
SIDS	Sustainable Infrastructure Development Symposium of South Africa
SIH	Space Infrastructure Hub
SIP	Strategic Infrastructure Project
SME	Small to Medium Enterprise
SMME	Small, Medium and Micro Enterprise
SMS	Short Message Service
SO	Space Operations
SONA	State of the Nation Address
SS	Space Science
Stats SA	Statistics South Africa
STEM	Science, Technology, Engineering, Mathematics
STEMI	Science, Technology, Engineering, Mathematics, and Innovation
STI	Science, Technology, and Innovation
SuperDARN	Super Dual Auroral Radar Network
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TRS	Technical Requirements Specification
UN	United Nations
URS	User Requirements Specification
WYPWD	Women, Youth, and People with Disabilities

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KEY DELIVERABLES FOR THE 2022/23 YEAR

- 1) SANSa will deliver **six high-impact products and services (PS)** across the following areas:
 - a) PS1: Data as a service,
 - b) PS2: Remote sensing products,
 - c) PS3: Infrastructure (platforms) as a service,
 - d) PS4: Magnetic technology services,
 - e) PS5: Space weather services,
 - f) PS6: Space operation products and applications, and
 - g) PS7 – Space Engineering Services (AIT and CDF).
- 2) SANSa will aim to achieve a **research productivity score of 1 445**, which is a composite score based on publications, graduated students, research funding, and researcher rating achieved.
- 3) SANSa will provide **support to 72 students and interns** for studies in Earth Observation, Space Science, and Space Engineering.
- 4) SANSa will aim to generate **R70 million from both national and international space operations contracts**.
- 5) SANSa will **raise awareness of 37 250 youth**, through direct engagement.
- 6) In accordance with government's transformation agenda SANSa aims to ensure **30% of its operational expenditure is directed at small to medium enterprises (SMEs)** through its various programmes.
- 7) *SANSa will **strengthen the national space capacity** that services national, regional and global needs **through infrastructure investment**. Priorities for 2022/23 will include securing funding and initiation of acquisition processes for the **SIH Phase-1 mission system**.*

The key deliverables outlined above are indicative of SANSa's contribution towards the achievement of the following DSI strategic outcomes for the 2020-2025 five-year strategic period: (i) A transformed, inclusive, responsive, and coherent NSI; (ii) Increased knowledge generation and innovation output; (iii) Human capabilities and skills for the economy and for development; (iv) Knowledge utilisation for economic development - focused on revitalising existing industries and stimulating R&D led industrial development; (v) Knowledge utilisation for inclusive development; and (vi) Innovation in support of a capable and developmental State.

PART A: OUR MANDATE

1. UPDATES TO THE RELEVANT LEGISLATIVE AND POLICY MANDATES

Like all national and provincial government departments and entities, the work of SANSa is anchored by the Constitution of the Republic of South Africa, Act No.108 of 1996, which serves as the supreme law. SANSa ultimately derives its mandate from the Constitution and the South African National Space Agency Act (No. 36 of 2008) as its regulatory instruments.

The Agency's collaborations related to space research, resource mobilisation and capacity building, amongst other key priorities, are guided by the constitutional requirement for all spheres of government to work together in addressing poverty, unemployment and inequality, and promoting the development of South Africa.

In this light, key relevant sections from the Constitution include the following:

- 1) Section 22 – *“Every citizen has the right to choose their trade, occupation or profession freely. The practice of a trade, occupation or profession may be regulated by law”*; and
- 2) Section 41 - Principles of cooperative government and intergovernmental relations: which requires all spheres of government to, amongst other requirements (h) cooperate with one another in mutual trust and good faith by: *“i. fostering friendly relations; ii. assisting and supporting one another; iii. informing one another of, and consulting one another on, matters of common interest; and iv. coordinating their actions and legislation with one another”*.

The South African National Space Agency (SANSa) is a Schedule 3A Public Entity that formally came into existence on 3 December 2010 in terms of the Public Finance Management Act (No.1 of 1999, as amended by Act 29 of 1999).

The legislative mandate is premised on two primary Acts, namely:

- 1) **The Space Affairs Act (No. 84 of 1993)**

The Space Affairs Act is an instrument of the Department of Trade, Industry and Competition (**dtic**) and caters for the regulatory and policy context for the South African space programme. It is intended for:

- a) Meeting all the international commitments and responsibilities of the Republic in respect of the peaceful utilisation of outer space, to be recognised as a responsible and trustworthy user of outer space; and
 - b) Controlling and restricting the development, transfer, acquisition, and disposal of dual-purpose technologies, in terms of international conventions, treaties and agreements entered or ratified by the Government of the Republic.
- 2) **The South African National Space Agency (SANSa) Act (No. 36 of 2008):**

The SANSa Act is an instrument of the Department of Science and Innovation (DSI) and enables the establishment of SANSa as an implementing agency for the South African space programme. It is a regulatory instrument that provides the Minister of Science and Innovation

the powers to establish SANSa as an implementing agency for the National Space Programme.

In terms of the Act, the establishment mandate of SANSa is to:

“...provide for the promotion and use of space and co-operation in space-related activities, foster research in space science, advance scientific engineering through human capital and support the creation of an environment conducive to industrial development in space technologies within the framework of national government policy...”

The primary objectives of SANSa are to:

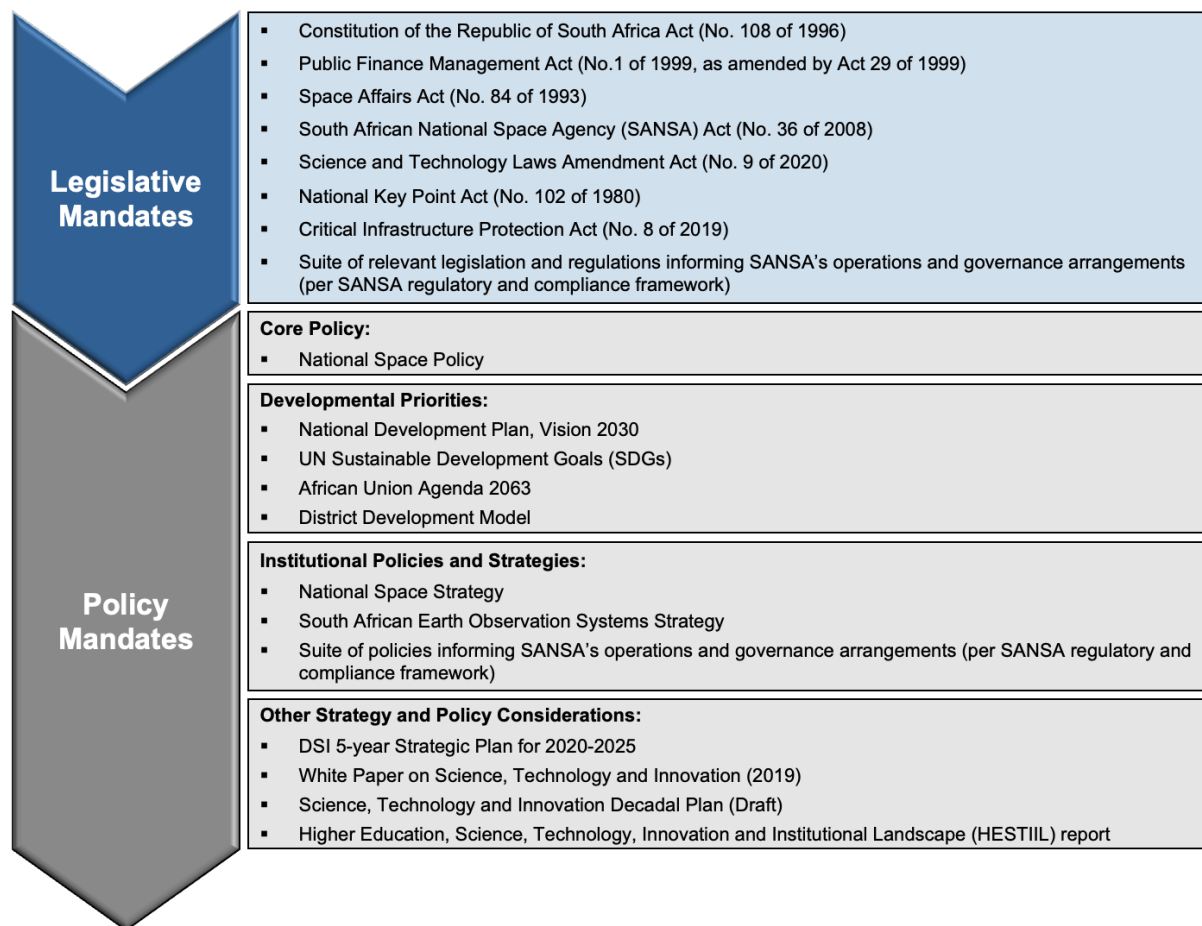
- a) Promote the peaceful use of outer space.
- b) Support the creation of an environment conducive to industrial development in space technology.
- c) Foster research in space science, communications, navigation, and space physics.
- d) Advance scientific, engineering, and technological competencies and capabilities through human capital development outreach programmes and infrastructure development.
- e) Foster international cooperation in space-related activities.

In pursuit of the achievement of these objectives, SANSa is expected to carry out the following functions:

- a) Implement any space programme in line with the policy determined in terms of the Space Affairs Act.
- b) Advise the Minister on the development of national space science and technology strategies and programmes.
- c) Implement any national space science and technology strategy.
- d) Acquire, assimilate, and disseminate space satellite imagery for any organ of State.

The legislative and policy mandates discussed in the 2020-2025 Strategic Plan, reflects broadly as follows:

Figure 1: SANSa key legislative and policy mandates



The Science and Technology Laws Amendment Act (No. 9 of 2020) has been promulgated. The Act amends the establishment legislation of several the DSI public entities, including the South African National Space Agency Act (No.36 of 2008). It intends to harmonise and streamline the processes related to the governance arrangements of the accounting authorities of the public entities. The implication to SANSa is being assessed and will be enforced as part of the Agency's regulatory compliance measures.

It should also be noted that the Department of Trade, Industry and Competition (the dtic) is in the process of revoking and replacing the Space Affairs Act. The South African Industry Space Industry Regulatory Bill marks a policy shift from the control of dual-use technology to the stimulation and support of the local industry. The primacy of the new Act is to limit liability to the State in terms of UN treaties and conventions, and this will be done through imposing new licencing requirements upon the local industry, including SANSa. SANSa will be required to register with the Regulatory body and have appropriate insurance, which is not currently the case.

The District Development Model (DDM) has progressed since its pronouncement by the President of South Africa during his SONA in 2019. The DDM profiles of the 44 district municipalities and eight metropolitan municipalities have been completed, with the focus now on finalising the district level DDM One Plans. The aim is to improve the coherence and impact of government service delivery and development by using the existing legal framework for coordinating and aligning development priorities and objectives between local, provincial, and national spheres of

government. The DDM presents SANSa with the opportunity to elevate its profile, to promote and make available space-related infrastructure, products, and applications at a local level.

The South African Economic Reconstruction and Recovery Plan (2020) (ERRP) is directed at addressing the deepening economic crisis brought on by the Covid-19 pandemic. SANSa has identified its contribution to the nine priorities of the ERRP, which will receive a major boost once the funding for the Space Infrastructure Hub (SIH), as a top five SIDs project, is secured.

2. UPDATES TO INSTITUTIONAL POLICIES AND STRATEGIES

The institutional policies and strategies, as reflected in the 2020-2025 Strategic Plan, have not been changed and, therefore, remain relevant for the 2022/23 financial year.

However, the SANSa Space Infrastructure Hub programme has been gazetted as a Strategic Infrastructure Project (SIP) 22 and has been able to attract R4.47 billion of investor funding to strengthen the space value chain. SANSa is currently conducting the project viability and bankable feasibility assessment for Board approval and presentation to Infrastructure South Africa. The project is viewed as a game changer and once these funds are secured SANSa will be in the position to significantly enhance the profile of the organisation in terms of the fulfilment of its mandate.

The Higher Education, Science, Technology and Innovation Institutional Landscape (HESTIIL) Review Report (2020) has been finalised and proposes interventions to pivot the NSI towards a higher growth trajectory and performance. SANSa will take the lead of the DSI in aligning with the levers of change.

The Science, Technology and Innovation (STI) Decadal Plan (Draft, May 2021) is being developed to serve as the implementation plan for the 2019 White Paper. SANSa's efforts and investment focused on building and maintaining a competitive national space infrastructure that fosters research and development, delivery of products and services, industry development and strengthening international partnerships, will be positioned to support the nine priorities. The articulated outcomes in SANSa's Revised Strategic Plan for 2020-2025 provide evidence of space science and technology deliverables on the identified themes in the Decadal Plan, as follows:

- 1) Modernise sectors, including support for SMEs and co-operatives.
- 2) Exploit new sources of growth – for competitiveness and job creation.
- 3) Support social progress – economic inclusivity and sustainable livelihoods.
- 4) Utilise technological advancement to contribute to an STI-enabled capable State – for improved service delivery and decision-making.
- 5) Increase support for responsible environmental custodianship and respond effectively to climate change.

3. UPDATES TO RELEVANT COURT RULINGS

At the time of developing this SANSa Annual Performance Plan for 2022/23, there were no relevant court rulings that would impact on the Agency's capability to deliver on its mandate as provided by

the South African National Space Agency Act (Act No. 36 of 2008) to the extent possible given the resources at its disposal.

PART B: OUR STRATEGIC FOCUS

In giving effect to the legislative and policy mandate outlined in Part A, the Revised 2020-2025 Strategic Plan articulates the South African National Space Agency’s strategic focus – its vision, mission, and institutional values – as follows:

VISION
<p>SANSA’s vision statement for repositioning the South African space programme is:</p> <p style="text-align: center;"><i>“An integrated National Space Capability that responds to socio-economic challenges in Africa by 2030”.</i></p>

MISSION
<p>SANSA’s mission statement for what it is the South African space programme does is:</p> <p style="text-align: center;"><i>“To provide leadership in unlocking the potential of Space for the advancement and benefit of humanity”.</i></p>

SANSA has six core values, referred to as STRIPE, that its employees pledge to uphold through an “earn your STRIPE” campaign, namely:	
Service	Deliver superior customer value on time every time.
Teamwork	Consult, inform and share knowledge.
Respect	Acknowledge and value what is good.
Integrity	Keep promise and own up to mistakes.
Personal Growth	Acknowledge potential and grow competence.
Excellence	Go the extra mile and implement tasks to the best of our ability.

1. UPDATED SITUATIONAL ANALYSIS

1.1. EXTERNAL ENVIRONMENT ANALYSIS

Global growth projections for 2021 and onwards are positive but remain strained by the uncertainties surrounding the varied impact of Coronavirus on different economies. According to

the IMF World Economic Outlook, after the contraction of 3.3% in 2020, the global economy is projected to grow at 6% in 2021, tailing off to 4.4% in 2022¹.

The global forecast indicates clear differences between emerging markets (which are being lowered) and advanced economies (which are being increased). The varied growth projections imply wide negative output gaps and elevated unemployment rates, particularly in emerging market economies. The adverse impact on low-income households is particularly acute, imperilling the significant progress made in reducing extreme poverty in the world since the 1990s².

According to the Organisation for Economic Co-operation and Development (OECD), the South African economy is projected to rebound by 3.8% in 2021 and 2.5% in 2022. The rebound experienced at the end of 2020 slowed in the first half of 2021 due to a protracted second wave of the virus, followed by a third wave in the third quarter. Growth is projected to pick up in the second half of 2021, driven by domestic demand and commodity exports, this after a contraction of 7.2% in 2020³.

Whilst inflation is increasing, it has remained below the Reserve Bank's target, and this has allowed monetary policy authorities to maintain current policy interest rates until the end of 2021. Fiscal policy will continue to be constrained to limit debt growth. However, fast implementation of government's Infrastructure Investment Plan is essential to lift growth. Unlocking electricity production too, will be key to lifting production bottlenecks and restoring confidence.

Unemployment continues to impact progress in South Africa with the unemployment rate increased by 1.8% to 34.4% in Q2:2021, its highest level in ten years⁴ and showing the impact of the Covid-19 pandemic on South Africa's employment landscape. Youth aged 15-24 years and 25-34 recorded the highest unemployment rates of 64.4% and 42.9% respectively. It is imperative that SANSa contributes to government's agenda to make a dent in youth unemployment over the remaining period of the sixth administration.

The underperforming economy and resultant budgetary cuts pose a significant risk to SANSa's collaboration and resource mobilisation efforts with both local and international stakeholders. In addition to this, the Agency has felt the impact of the Covid-19 pandemic, particularly during the extended lockdown period in the 2020/21 financial year which necessitated downward revisions to several planned performance targets that could no longer be effectively pursued due to restricted contact with targeted beneficiaries. The Agency, however, continues to focus on the innovative use of technology to minimise any negative impact on its operations and remains committed to the rollout of programmes aimed at enhancing the national space capability over the period of the five-year strategic plan against which this APP aligns.

¹ International Monetary Fund (2021). *World Economic Outlook Update, July 2021*.

² International Monetary Fund, *World Economic Outlook, June 2020*

³ Minister Tito Mboweni: 2021 Budget Speech

⁴ StatsSA Quarterly Labor Force Survey Q2:2021.

1.1.1. PESTLE ANALYSIS

An analysis of the key macro-environmental factors impacting on the work of SANSa is summarised in the table below.

Table 1: Macro-environmental factors impacting on SANSa

QUESTION	IMPLICATIONS FOR SANSa
Political factors	
What are the political risks?	A change in administration could mean a change in policy directives and priorities, which could adversely affect the national space sector.
How does the public perceive SANSa?	Although SANSa is known by those who engage with SANSa, there is a need to raise the visibility and appreciation of SANSa’s work in the public domain.
Who speaks for SANSa?	<p>Although SANSa drives the implementation of the Space Policy and Strategy in line with government user needs, the effective coordination across the different spheres of government and all organs of state should be a policy directive, spearheaded by the DSI.</p> <p>Efforts aimed at positioning SANSa at the centre of the National Space Programme will therefore seek to further elevate the work of the entity as a national priority.</p>
Who speaks against SANSa?	The work of SANSa could be misunderstood and seen as a nice to have amongst all the competing national priorities – more so given the perpetual economic constraints facing South Africa.
How should SANSa be responding?	By providing positive input into Decadal Plan and adopting a leadership role in partnering with the Department to prioritise projects, underpinned by research/evidence.
Economic factors	
How is the budget?	<p>The budget allocation is suboptimal and insufficient to run a National Space Programme, particularly to operationalise and sustain key programmes and meet user needs.</p> <p>SANSa, therefore, requires adequate investment to be made in the Space Programme in the short to medium term for the provision of relevant products and services that respond to key government and private sector user requirements.</p> <p>Adequate investment will support the longer-term strategic horizon of commercialisation and revenue growth for enhanced sustainability.</p>
How is SANSa effected by economic trends?	The economic recession and poor investment rating have meant that the cost of borrowing has increased, and National Treasury is rationalising budgets with the threat of budget cuts on the cards, which affects SANSa adversely.

QUESTION	IMPLICATIONS FOR SANSa
How can SANSa evolve to maximise the demand for its product?	SANSa must secure investor funding to be able to deliver on its mandate and remain sustainable, whilst responding to end user needs.
How are customers effected by economic factors?	Customers' ability to pay for accessing products and services is adversely affected, which could affect SANSa's revenue generation model.
Does SANSa have costs under control?	There is the ongoing need to rationalise and streamline costs to ensure cost efficiencies in operations, but the cost of compliance remains high.
How does SANSa become financially sustainable / independent?	<ul style="list-style-type: none"> ▪ Investor funding for the SIH will ensure that SANSa is able to capacitate its base infrastructure in a shorter space of time, provided there is a financial return and the long-term sustainability of SANSa, and the sector is assured. ▪ SANSa needs to become customer-centric focused and commercially oriented. ▪ Consider ways of reducing overhead costs, through automation and reducing inefficiencies, to become more competitive.
What are the threats and opportunities in Africa?	There is a burgeoning of space programmes on the continent that could pose a direct competition to SANSa in the long term. In the short-to medium-term, however, there are key SANSa initiatives that makes the organisation a forerunner on the continent and a partner of choice.
Sociological factors	
How is SANSa effected by educational trends?	There is no single South African qualification for space science and technology, as the sector draws its resource requirements from different disciplines. SANSa should explore targeted tertiary space qualifications.
How is SANSa effected by social trends?	Social media plays a major role in shaping the perceptions relating to SANSa and this needs to be carefully managed.
How is the SANSa brand perceived in the public domain?	SANSa's brand visibility is suboptimal. SANSa's brand identity must be developed to help increase the institutional value in the public domain.
Is SANSa responding to the Triple Challenges?	<ul style="list-style-type: none"> ▪ SANSa's focus on contributing to addressing the Triple Challenges needs to be consolidated and elevated, as this work is not known. ▪ SANSa's active participation in and contribution to the District Development Model (DDM) is an opportunity that must be responded to. ▪ Leveraging more on social partnerships for the effective rollout of interventions at a district and local municipality level remains critical in this regard.

QUESTION	IMPLICATIONS FOR SANSa
Technological factors	
What sort of technological trends affect the organisation?	<ul style="list-style-type: none"> ▪ Technical: The 4IR and Big data could pose a challenge or an opportunity, depending on how the trends are embraced. ▪ Systems: The organisation is adopting a hybrid system, with much of its enterprise requirements moving to the cloud, which reduces the cost but requires a new mindset from staff. ▪ Processes: With the introduction of a new Business Model, SANSa's policies and processes need to be reviewed to ensure efficiencies and effectiveness. Work has commenced towards driving organisational optimisation and improved alignment across SANSa. ▪ Software: New and open-source software are opportunities for the organisation, but staff need to be re-skilled to capitalise on these opportunities.
How does SANSa utilise technology?	SANSa is exceptionally good at operations that relate to its core business but must get more tech savvy on other business areas to create efficiencies.
What could be done better?	<ul style="list-style-type: none"> ▪ The enterprise architecture is suboptimal, but with the committed investments the shortcoming is starting to be addressed. ▪ To assess the risk and put in place mitigation measures to address the threat faced at a macro-level of data being aggregated and made available for free. ▪ To better use technology to enhance the client experience when interacting with SANSa.
How is data handled?	<ul style="list-style-type: none"> ▪ Data is segregated within the organisation and an opportunity exists to streamline the storage and processing requirements to ensure costs and operational efficiencies. ▪ SANSa to consider adopting the ISO9000 Quality Standard across organisation.
Legal factors	
What legal implications can affect SANSa's work?	<ul style="list-style-type: none"> ▪ Health: The current Covid-19 pandemic and the lockdown measures has constrained the movement of staff, having to adhere to the protocols instituted by the Department of Health and Department of Labour. ▪ Safety: Safety of staff is deemed critical and workplace incidents could hamper business and, therefore, adoption of ISO45000 across SANSa should be considered. ▪ Compliance: The regulatory universe is quite broad, with over 70 pieces of legislation affecting SANSa to differing degrees and risk assessment needs to be conducted. ▪ Training: Given the heavy compliance requirements that must be adhered to, training and awareness to staff on legal requirements

QUESTION	IMPLICATIONS FOR SANSa
	<p>and best practices needs to be instituted to ensure adherence to the regulatory frameworks.</p> <ul style="list-style-type: none"> ▪ Financial: The cost of compliance is significant and the punitive measures for non-compliance could adversely affect the business. This could be mitigated with the appointment of a compliance officer. ▪ PFMA: To streamline and improve the efficiency and effectiveness of SANSa's SCM/acquisition processes. This includes through the adoption of strategic sourcing. The organisation will also require a special dispensation to borrow, as part of the contracting requirements for receiving investor funds for the SIH.
<p>How does SANSa mitigate risks?</p>	<ul style="list-style-type: none"> ▪ Ensuring effective regulatory compliance and a robust governance framework, together with appropriate business intelligence, will assist SANSa in understanding the business risks and developing appropriate risk mitigation measures. ▪ Ensure the appropriate knowledge management systems, processes, and tools are in place to inform evidenced-based decision-making.
<p>What external legal changes can affect the organisation?</p>	<ul style="list-style-type: none"> ▪ The Space Affairs Act will be repealed and replaced with a new South African Industry Regulation Act, which seeks to reduce the liability/vulnerability of the State. Once assented, it will have an implication on the licencing requirements for SANSa. ▪ Amongst other requirements, SANSa will have to apply for a licence for its facilities, to register with the Regulatory body and have insurance for space missions.
<p>Environmental factors</p>	
<p>How does SANSa engage on environmental issues?</p>	<p>SANSa plays a significant role in the implementation of the SDGs, but this work needs to be consolidated and elevated in the public space.</p>
<p>Is SANSa responding to industry needs?</p>	<p>The shift in focus to industry development and the establishment of ZASpace Inc. has provided significant opportunities, but more needs to be done in driving the growth of the local space sector.</p>
<p>How do investors see SANSa?</p>	<ul style="list-style-type: none"> ▪ The work of SANSa is only now being recognised, which has realised several investment opportunities. However, continued success is contingent on the successful implementation of projects. ▪ SANSa needs to adopt integrated reporting, as this is what investors are looking for from a good governance point of view. ▪ Non-compliance to legislation (such as the PFMA) and regulations (such as the B-BBEE Code) is viewed negatively by investors and this needs to be turned around.
<p>How is SANSa responding to industry transformation?</p>	<ul style="list-style-type: none"> ▪ SANSa is establishing a cloud platform for data discovery and dissemination with analysis ready EO data for black SMMEs.

QUESTION	IMPLICATIONS FOR SANSa
	<ul style="list-style-type: none"> ▪ SANSa is establishing criteria for black SMMEs in the private sector access for commercial data under multi-user license. ▪ Increase spending with black SMMEs through subcontracting on tenders. ▪ Support the local industry through the AIT facility upgrade.

1.1.2. FULFILMENT OF SANSa’S MANDATE

The key priorities of government and associated user requirements, as discussed in section 3 above, can be mapped against the space thematic areas of Earth Observation, Navigation and Positioning, Satellite Communications, and Space Exploration. The outcome of this exercise is shown in Table 2 below, which forms a convenient technical reference map for SANSa’s key programmes and activities in meeting government’s needs.

Table 2 is thus central to the core business of SANSa and can be effectively used to assess whether the internal value chain of SANSa is aligned to delivering on the user needs of government. Using a colour coding classification, it is possible to assess whether SANSa is optimally meeting its mandate or not. The table is colour coded, with the following classifications:

- 1) Green – SANSa is meeting its mandate.
- 2) Yellow – SANSa is partially meeting its mandate.
- 3) Red – SANSa is not meeting its mandate.

Currently, SANSa is fulfilling its obligation in providing Earth observation data, products, and services for applications requiring above 1m resolution. However, this is realised with no effective mechanism in place to recoup costs, thus leaving SANSa with the burden of fully subsidising government from its parliamentary grant for these services. The applications requiring sub-1m resolution are costly, as access to the data is commercially available but relatively expensive – more can be done in this domain if SANSa is appropriately funded to access these datasets. However, when considering the number of national missions that support the Earth observation needs, then the situation is much more dire, with no such missions currently in operation.

The strategic projects that SANSa embarks on, such as the Space Infrastructure Hub, provide an opportunity to systematically update user requirements to appropriately inform the new missions required to meet these needs. SANSa has experienced that, although government users are willing to articulate their requirements and SANSa has demonstrated the ability to meet some of these needs, the government user’s willingness to pay for products and services could be enhanced by the effective coordination, across all organs of state, through a policy directive spearheaded by the DSI.

Table 2: Meeting the full mandate of SANSa

Key Priority Areas	Specific Needs	Earth Observation						Temporal Frequency	Geographic Area	Navigation & Positioning	Communication	Space Exploration	
		Spatial Resolution Required											
		< 50cm	50cm - 1m	1m - 2.5m	2.5m - 5m	5m - 10m	10m - 20m						20m - 30m
Environmental Resource Management	Environmental and geospatial monitoring								Annual	National			
	Ocean, coastal and marine management								Annual	SADC			
	Land management								Seasonal	National			
	Rural development and urban planning								Annual	National			
	Topographic mapping								Annual	National			
	Hydrological monitoring								Twice per annum	National			
	Climate change mitigation and adaptation								Daily	SADC			
Health, Safety & Security	Meteorological monitoring								Daily	SADC			
	Disaster monitoring and relief								Daily when required	SADC			
	Hazard forecasting and early warning								Twice per annum	SADC			
	Cross-border risks								2-4 times per annum	SADC			
	Disease surveillance and health risk								Twice per annum	National			
	Asset monitoring								Continuous	SADC			
	Regulatory enforcement								2-4 times per annum	National			
Innovation & Economic Growth	Defence, peacekeeping and treaty monitoring								High turn around time	Africa			
	Tourism and recreation								Annual	National			
	Communication								Continuous	SADC			
	Space science and exploration									National			
	Space technology transfer and spin-offs									National			
	Development of the space industry									National			

SANSa’s drive to meet its mandate is reflected in the number of strategic initiatives being undertaken over the planning period. These strategic initiatives have been designed to respond to key government requirements and to position SANSa as an enabler for the country. By increasing the available products and services developed from space know-how, SANSa can unlock the potential of space to ensure that government is able to respond to national challenges, such as climate change, spatial planning, and food security. The benefits of sustaining a National Space Programme can be reaped through a domestic capability and a national infrastructure platform that will lead to an inclusive domestic industry.

The concern is that SANSa is currently not servicing its mandate with respect to products and services applications for navigation and positioning, and satellite communications. The primary responsibility for these thematic areas resides in other government departments, other than the DSI. On the latter point, the Department of Transport (DoT) is responsible for navigation and positioning products and services, and the Department of Communication and Digital Technologies (DCDT) is responsible for satellite communications products and services. DCDT, in conjunction with the DSI, are currently motivating for a national telecommunications satellite, which will have implications for SANSa. A plan for a regional satellite-based augmentation system has been developed by SANSa but will be implemented once the requisite investment is secured.

With regards to space exploration, firstly, SANSa is implementing several programmes, but these and the potential of doing more is contingent on securing additional funding. Secondly, there are other areas of space exploration that sit outside of SANSa, a prime example being space geodesy, which is critically important for SANSa’s business but sits in the nexus between space science and

astronomy⁵. Thirdly, SANSa Space Operations is largely reliant on the generation of external revenue, which would constrain the unit from supporting space exploration missions. Hence, in the area of space exploration more can be done if (i) additional investments were secured and (ii) relevant structural reforms were made to optimise cross-collaboration with other public entities.

This Annual Performance Plan has been aligned to the financial resources available to SANSa for internal business operations and interventions aimed at providing broader support to the local space sector, which include the parliamentary grant, the revenues generated, and additional grants secured. Given the historic challenges relating to the Agency's ability to deliver fully on its mandate, focus during the 2022/23 financial year will, therefore, remain on the mandate-based approach that has been adopted in the 2020-2025 five-year strategic plan to identify what is required of SANSa at a national level.

1.2. INTERNAL ENVIRONMENT ANALYSIS

SANSa's Head Office oversees the Agency's operations and management, the Space Operations Programme (located in Hartebeesthoek), the Space Science Programme (located in Hermanus), the Earth Observation Programme, as well as a newly established Space Engineering programme (both situated alongside the Head Office) are responsible for the execution of the thematic projects, product development and service delivery.

1.2.1. REFLECTION ON PERFORMANCE

SANSa achieved 14 of the 17 APP output indicator targets in the 2020/21 financial year – an 82% performance rate for the first year of implementing the 2020-25 Strategic Plan. Despite the slight decline from the 100% performance achievement reported for the year prior, these achievements are to be considered as a major accomplishment given the difficult climate the Agency was operating in under Covid-19 lockdown restrictions, which took a significant toll on employees and beneficiaries of SANSa products and services alike. Further to this, the Agency continues to be confronted by funding constraints that impact on its delivery against the mandate of contributing towards developing the space industry as required by the SANSa Act.

Headline achievements for the past year were as follows:

⁵ By definition, space science includes astronomy, but in South Africa an artificial divide has been created resulting in two disparate competing disciplines that also reduces the effectiveness of cross-collaboration.

Table 3: Headline achievements for 2020/21 and plan for 2021/22

OUTPUT	2020/21 ACHIEVED (TARGET)	2021/22 PLANNED
Delivery of high-impact products and services	7 (6)	6
Research productivity score	1 904.44 (1 300)	1 300
Support to students and interns	60 (50)	50
Revenue generation from space operations contracts	R75.65 million (R68 million)	R69 million
Number of youths directly engaged on space awareness	2 937 (4 000), reduced contact time due to Covid-19 lockdown	21 125
Rand value outsourced to broader space industry (based on programme funding received)	R13.68 million (R10 million)	R10 million
Percentage of contract value to SMEs	51% (20%)	20%

1.2.2. HUMAN CAPITAL AND EMPLOYMENT EQUITY

At the end of the 2020/21 financial year, SANSa had a total of 193 employees in permanent employment. The vacancy rate at the end of the 2020/21 financial year was 32% and, while new positions have been approved and recruitment is underway in preparation for the implementation of the SIH, budgetary constraints to fill the vacant positions remain a concern. In addition to the permanent staff complement, SANSa has a total of 36 non-permanent employees in its employ.

Should the Agency manage to secure the required funding for strategic projects, such as the SIH together with additional funds for the operationalisation of the Space Weather Centre, such funds will cater for project resources, including the required human resources. A key challenge encountered during the planning phase is that resources currently remain stretched, as the Parliamentary Grant is not adequate for project planning and implementation given that it primarily covers the Agency’s operational costs.

Table 4: SANSa employment equity status

OCCUPATIONAL LEVELS	MALE				FEMALE				PERSONS WITH DISABILITIES		TOTAL
	A	C	I	W	A	C	I	W	Male	Female	
Top Management	0	0	1	0	0	0	0	0	0	0	1
Senior Management	1	0	1	1	1	0	0	2	0	0	6

OCCUPATIONAL LEVELS	MALE				FEMALE				PERSONS WITH DISABILITIES		TOTAL
	A	C	I	W	A	C	I	W	Male	Female	
Professionally Qualified (Mid-management)	9	2	5	19	14	0	2	5	1	0	57
Skilled Technical & Academically Qualified	35	5	4	10	29	4	1	9	0	0	97
Semi-skilled	10	2	0	1	10	4	0	0	0	0	27
Unskilled/Interns	2	0	0	0	3	0	0	0	0	0	5
TOTAL	57	9	11	31	57	8	3	16	1	0	193
Percentage of total	29.5%	4.7%	5.7%	16.1%	29.5%	4.1%	1.6%	8.3%	0.5%	0.0%	
	56%				43.5%				0.5%	0%	
Non-permanent employees	6	0	0	11	13	3	0	3	0	0	36

As discussed in the strategic plan, over the period between 2011 and 2021, the percentage of the permanent staff complement that are males has declined from 61.1% to 56%, while the number of females has increased from 38.2% of the staff complement to 43.5%. The biggest underrepresentation of females is in the professional and skilled categories. This is due to the national challenge of insufficient specialised skills amongst employable females within the Science, Engineering and Technology (SET) job categories. 53% of the non-permanent employees are females, of which a total of 16 are black (African, 13 and Coloured, 3).

Employment equity will remain at the forefront of SANSa’s recruitment approach in the 2022/23 financial year, in line with available funding. The organisation remains committed to advancing the transformation agenda and aligning with the proposed Sectorial Equity Targets that have been set by the Department of Labour.

1.2.3. SPACE ECOSYSTEM DEVELOPMENT AND INDUSTRY TRANSFORMATION

A key mandate of SANSa relates to:

- 1) Supporting the creation of an environment conducive to industrial development in space technology.
- 2) Fostering research in space science, communications, navigation, and space physics.
- 3) Advancing scientific, engineering and technological competencies and capabilities through human capital development outreach programmes and infrastructure development; and
- 4) Fostering international cooperation in space related activities.

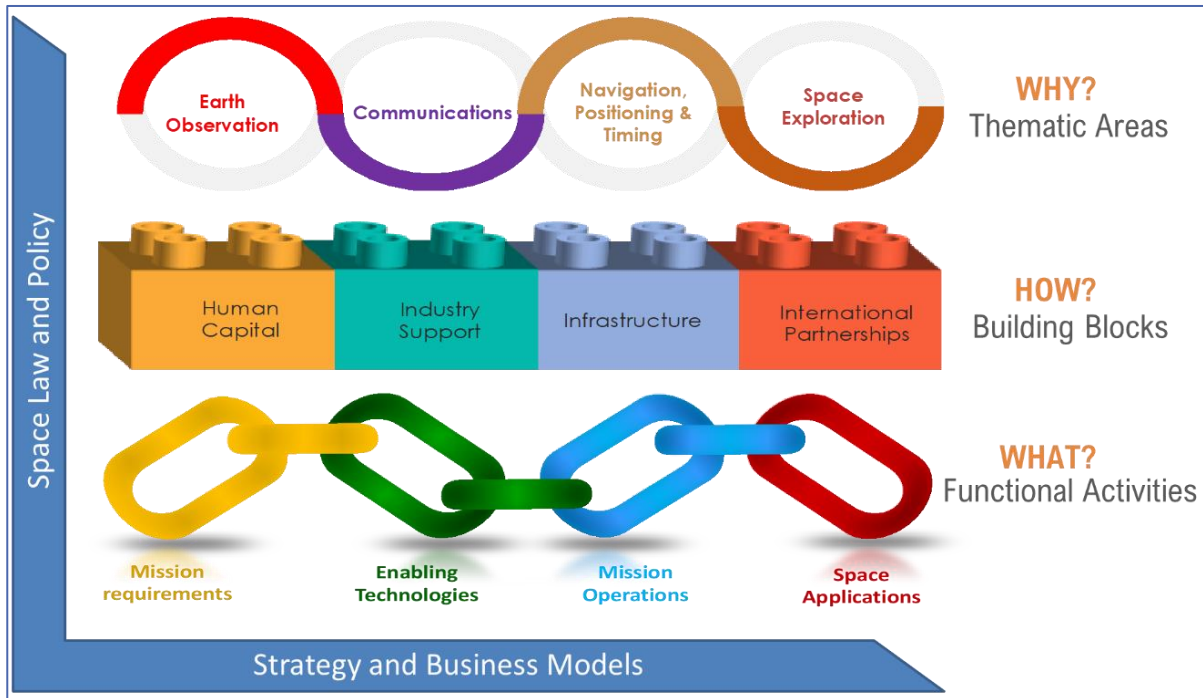
This mandate advocates the need for SANSa to adopt a different approach from yesteryears and these nuances are presented briefly below.

National Space Ecosystem Approach

SANSa needs to drive the national space ecosystem, as shown in Figure 1 below, which includes the following elements:

- 1) **Thematic areas** – these focus on specific applications, products and services in the classical space domains, namely:
 - a) Earth observation.
 - b) Telecommunications.
 - c) Navigation, positioning and timing; and
 - d) Space exploration.
- 2) **Building blocks** – these comprise the foundational elements that determine the strength and success of the ecosystems in terms of:
 - a) Human capital to develop local expertise.
 - b) Industry development and support.
 - c) Ground and space-based infrastructure; and
 - d) International partnerships.
- 3) **Functional activities** – these relate to the day-to-day activities that space initiatives are engaged in and range from:
 - a) Establishing requirements for specific missions.
 - b) Engaging in R&D activities for enabling technologies.
 - c) Operations of mission, to
 - d) The development and use of space applications.
- 4) **Space law and policy** – the appropriate framing of laws and policies as it relates to the national space ecosystem is vital, as it determines the key governance constructs required for effective space programmes.
- 5) **Strategy and business models** – strategic instruments are key to providing the necessary direction and aspiration for the national space ecosystem, and the associated business model informs the architecture and institutional arrangements.

Figure 2: Key elements of a space ecosystem.



Transformation of the local industry

Whilst SANSa is advancing the national space ecosystem, cognisance is taken of the underlying systemic challenges facing the local industry, which can be postulated as follows (highlighted in blue, with desired state reflected in green):

- 1) The growth of the local space sector **has stagnated with limited (significant with strong)** support afforded by SANSa and other public sector institutions.
- 2) This affects both the upstream and downstream segments, but especially the downstream which **has not historically received (is now receiving)** targeted government support.
- 3) The attendant effect of the status quo is as follows:
 - a) The financial sustainability of the industry is **precarious (robust)**.
 - b) There is **limited (powerful)** local beneficiation **due to (and less)** reliance on international data vendors.
 - c) **Inadequate (ample)** access to the local, African, and global markets.
 - d) **Slow (fast)** pace of transformation of the industry; and
 - e) **Limited (a healthy)** number of SMEs and new entrants.

This transition of the local industry from the **current state** to the **future preferred state** will require a directed and concerted effort to transform the sector.

1.2.4. SWOT ANALYSIS

The 2022/23 APP has taken into consideration the critical issues and focus areas derived from the analysis of SANSa's strengths, weaknesses, opportunities and threats (SWOT), outlined below.

Table 5: SANSa SWOT Analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> ▪ A proven space heritage relating to historic missions. ▪ A core skills base is in place to deliver on a National Space Programme. ▪ There are strong strategic partnerships that SANSa is currently engaged in. ▪ SANSa's reputation in the international market makes it a partner of choice. ▪ SANSa has the base space infrastructure needed for a National Space Programme. ▪ A suite of space products and services have already been produced, giving the organisation the know-how for future developments. ▪ SANSa's mandate is stipulated as a matter of law. ▪ SANSa has evolved in terms of its transformation agenda. 	<ul style="list-style-type: none"> ▪ Ineffective performance management system within SANSa. ▪ Lack of capacity and limited capabilities within SANSa to secure new opportunities. ▪ Organisational culture that hampers performance. ▪ Lack of a common identity and strategic direction. ▪ Insufficient funding to achieve full mandate. ▪ Lack of internal and external visibility for SANSa. ▪ Ageing infrastructure that needs to be replaced in the very near future. ▪ ICT maturity is suboptimal. ▪ Non-achievement of a clean audit outcome in the last two financial years. ▪ Non-compliance to B-BBEE is affecting SANSa's funding opportunities.
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ▪ External partnerships with other countries or entities/universities in foreign countries, including the growing African space sector. ▪ Access to funding through strategic partnerships. ▪ Potential to grow own revenue stream by leveraging funds. ▪ Organisation of choice in as far as space science and technology is concerned. ▪ Building brand identity will help increase SANSa's institutional value. ▪ Going back to the mandate to scope out new opportunities. 	<ul style="list-style-type: none"> ▪ Competing government priorities that could reduce potential funding streams. ▪ Unhealthy competition within the South African NSI. ▪ Technology advances faster than what SANSa can capitalise. ▪ Radio and magnetic interference that could adversely hamper operations. ▪ Many African countries are establishing space programmes, which impacts our competitive advantage. ▪ Cannot get traction on key projects (EO-Sat1 and Houwteq) due to external dependencies.

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ▪ The District Development Model provides an opportunity to ensure adoption of space products and services at a local level. ▪ The SIH will help SANSa leapfrog its operational infrastructure challenges. ▪ Establishment of ZASpace Inc. provides a convenient listening post with industry. ▪ Implementation of a new SANSa business model, including the identification of a political champion to strengthen the political relationships. ▪ Leverage opportunities under single Ministry for Higher Education, Science and Technology. 	<ul style="list-style-type: none"> ▪ Slow pace of government bureaucracy could hamper SANSa’s response to key opportunities. ▪ Funding instruments only fund Capex but exclude Opex. ▪ Loss of key SANSa skills to the external environment due to lack of opportunities to apply their skills.

BUILDING ON THE STRENGTHS:

- 1) ***A proven space heritage relating to historic missions*** – document the intellectual property (IP), register it, and make it available for the broader industry to use and commercialise. Associated with this space heritage, SANSa must build its brand value and market the national capabilities both nationally and internationally, ensure employee retention within the space sector, and maintain and upgrade critical infrastructure to reinforce and build upon the heritage.
- 2) ***A core skills base is in place to deliver on a National Space Programme*** – create an innovation platform that will build upon and utilise the current skills base. Personal development and career growth opportunities need to be instituted that will include mentoring, coaching, and training. In addition, universities will be engaged to develop space curricula that will be supported by SANSa.
- 3) ***There are strong strategic partnerships that SANSa is currently engaged in/SANSa’s reputation in the international market makes it a partner of choice*** – focus will be extended on partnership frameworks, such as Brazil, Russia, India, China, and South Africa (BRICS) and the African Resource Management Constellation (ARMC). Collaborative projects and resource sharing with the international community will be operationalised through formal memorandums of understanding/agreements. SANSa will work with the DSI to ensure it is positioned to take advantage of any other opportunities that arise with regional and international partners. In addition, SANSa will position its experts to take a seat on international committees that respond to global challenges, ensuring that South Africa retains its reputation within the global arena.
- 4) ***SANSa has the base space infrastructure needed for a National Space Programme*** – efforts will be targeted at maintaining and upgrading the current infrastructure, as well as lead and develop needed infrastructures, such as calibration/validation sites and the assembly, integration, and testing facility. These efforts will be validated through quality assurance processes and certification of facilities and products, where necessary.

- 5) ***A suite of space products and services have already been produced, giving us the know-how for future developments*** – the broader industry will be empowered to develop and provide innovative base-line products and services to end users. Improvements will also be focused on stakeholder engagement and customer relationship management to improve customer services.
- 6) ***SANSA’s mandate is stipulated as a matter of law*** – where there are conflicts due to delineation of roles and responsibilities, SANSA will use its mandated powers to provide leadership and support to industry and the broader space sector. SANSA will also facilitate and coordinate stakeholders to ensure optimum development and advancement of the sector.
- 7) ***SANSA has evolved in terms of its transformation agenda*** – while there have been significant shifts in the employment profile of SANSA, continued focus will be given to increasing the representation of the designated groups, especially females, in the sector professional and skilled categories. SANSA will strive towards achieving the 30% procurement spend on SMEs, towards achieving the MTSF preferential procurement targets. SANSA’s Human Capital and Skills Development Programme will continue to be a focus to enhance the capabilities of the sector.

ADDRESSING THE WEAKNESSES:

- 1) ***Ineffective performance management system within SANSA*** – a new performance management system will be developed for SANSA that will consider this strategic framework when contracting for performance management.
- 2) ***Lack of capacity and limited capabilities to secure new opportunities*** – appropriate recruitment and selection of employees will be pursued and, in tandem, a continuous development programme will be instituted. Effective capacity will be created in areas that SANSA is not currently operating in.
- 3) ***Organisational culture that hampers performance*** – an organisational culture change process will be undertaken to reset the underlying culture. This will allow management to correct any behavioural identity that is not in keeping with what is required for SANSA and to establish new behavioural norms.
- 4) ***Lack of a common identity and strategic direction*** – this strategic framework will help set a new strategic direction for SANSA, which will be regularly communicated and reinforced throughout the organisation and externally. Monitoring and evaluation of progress along the new strategic direction will be periodically measured and corrective action will be taken, where necessary.
- 5) ***Insufficient funding to achieve our full mandate*** – in line with this strategic framework and a Financial Sustainability Framework, new funding opportunities will be explored. Where possible SANSA’s existing resources will be utilised to leverage additional funding through joint partnerships or incentive schemes.
- 6) ***Lack of internal and external visibility for SANSA*** – measures will be taken to improve marketing and communications of the core activities undertaken and supported by SANSA. For this purpose, an integrated marketing and communications plan will be developed and implemented to promote national space activities, both internal and external to SANSA.

- 7) **Ageing infrastructure that needs to be replaced in the very near future** – where possible the lifespan of existing infrastructure will be extended through maintenance and upgrade initiatives. Where necessary, recapitalisation of critical infrastructure will be prioritised to ensure continued or expanded operations.
- 8) **ICT maturity is suboptimal** – the implementation of a revised ICT strategy is a vital part of SANSa's change elements for the medium term, which includes business processes automation and the rollout of additional modules of the SAGE Enterprise Resource Planning System.
- 9) **Non-achievement of an unqualified audit outcome with no material matters in the last two financial years** – by addressing the recommendations of internal and external audit, as per the Audit Action Plan, SANSa intends to achieve an unqualified audit opinion with no material findings in the 2021/22 financial year, and to maintain the clean audit outcome over the duration of this planning period.
- 10) **Non-compliance to B-BBEE is affecting SANSa's funding opportunities** – attention will be given to implementing SANSa's five-year B-BBEE Action Plan to ensure improvement of the Agency's score from non-compliance to level 8.

CAPITALISING ON THE OPPORTUNITIES:

- 1) **External partnerships with other countries or entities/universities in foreign countries** – SANSa will tap into memorandums of understanding/agreements it has with other space agencies and science institutions to forge collaborations that will benefit the national space sector. This will also include piggybacking on pre-existing and new interagency and intergovernmental bilateral agreements.
- 2) **Access to funding through strategic partnerships** – SANSa will work together with institutions within the NSI to leverage additional funding. This will require firmer stakeholder management with government entities and its agencies and pursuing public-private partnerships where necessary.
- 3) **Potential to grow own revenue stream by leveraging funds** – SANSa must reorganise itself to leverage external funds by establishing a business development team that will strategically pursue opportunities. Co-investments or self-investments in joint collaborative projects will also be pursued to reduce the financial burden and thereby leverage financial efficiencies.
- 4) **Organisation of choice in as far as space and technology is concerned** – SANSa must be seen as an organisation of choice for national socio-economic environmental programmes where space applications products and services are required. SANSa will then be able to coordinate efforts within the NSI. Examples of such initiatives are the National Development Plan, Operations Phakisa, and the Sustainable Development Goals.
- 5) **Building brand identity will help increase SANSa's institutional value** – where the different business units are differentiated in terms of brand value, this will be collapsed into a single brand for SANSa. All marketing and communications efforts must be appropriately coordinated across SANSa.
- 6) **Going back to the mandate to scope out new opportunities** – through this strategic framework, SANSa will relook at its business model and focus on strengthening the space

value chain. Where key focus areas are not currently being implemented by SANSa, these will be embedded in SANSa's operational focus.

- 7) ***The District Development Model provides an opportunity to ensure adoption of space products and services at a local level*** – SANSa will work with the DSI and other government departments such as COGTA and applicable district municipalities to promote the use of space-related products and services that will support improved decision-making and service delivery at a local level. Infrastructure programmes will contribute to local job creation.
- 8) ***The SIH will help SANSa leapfrog its operational infrastructure challenges*** – R4.47 billion funding has been secured and SIH has been registered as a strategic investment project (SIP22). SANSa has contracted the Government Technical Advisory Centre (GTAC) to conduct a viability assessment / feasibility study, which will pave the way for contracting and project implementation. Progress is monitored regularly by an executive-level steering committee.
- 9) ***Establishment of ZASpace Inc. provides a convenient listening post with industry*** – to leverage the opportunity that ZASpace Inc. provides to better understand and collaborate with industry, thus improving business decision-making and providing opportunities for sector growth.
- 10) ***Implementation of a new SANSa business model, including the implementation of mechanisms to strengthen the political relationships*** – with support from the Government Technical Advisory Centre (GTAC), SANSa has taken crucial steps that have led to the development of a business model and macro structure, both of which seek to enhance the ability to deliver on its mandate. An implementation plan has been developed and will be rolled out over the short to medium term.

This includes the development and implementation of a revised macrostructure, followed by the development and capacitation of an aligned microstructure. A change management process has commenced and will be rolled out over the next two years. The emphasis is on teamwork, enhanced alignment between programmes, promoting collective accountability for the achievement of SANSa's mandate and promoting a high-performance culture.

- 11) ***Leverage opportunities under single Ministry for Higher Education, Science and Innovation*** – Through the DSI, SANSa will take proactive steps to ensure space-related human capital development interventions are included in the Sector Skills Development Strategy.

MANAGING THE THREATS:

- 1) ***Competing government priorities that could reduce potential funding streams*** – SANSa must establish a strong business case that demonstrates significant value proposition for government activities. SANSa must also use the said value proposition to secure a baseline of funding at the appropriate levels required to sustain its operations.
- 2) ***Unhealthy competition within the South African National System of Innovation*** – SANSa must define its role and responsibilities vis-à-vis other role-players in the space sector. SANSa must protect its mandated responsibilities and coordinate and support activities implemented by external stakeholders. By ensuring the provision of a cost-effective

national infrastructure platform SANSa can position itself to be an effective enabler for other players within the national system of innovation.

- 3) **Technology advances faster than what SANSa can capitalise** – SANSa will need to invest more in R&D and improve on the innovative use of its existing technologies. Where necessary, capitalisation on new technologies and recapitalisation on existing technologies will be prioritised to ensure that the space value chain is strengthened.
- 4) **Radio and magnetic interference that could adversely hamper operations** – where possible, use the Astronomy Geographic Advantage Act to declare and protect the area around the Hermanus and Hartebeesthoek facilities against magnetic and radio interference, respectively. A closer working relationship will also need to be established with the Independent Communications Authority of South Africa (ICASA), and the local municipal authorities for those areas.
- 5) **Many African countries are establishing space programmes, which impacts our competitive advantage** – SANSa will forge strategic collaborative partnerships with most of these countries to ensure a win-win situation that is of mutual benefit.
- 6) **Difficulty in gaining traction on key projects (EO-Sat1 and Houwteq) due to external dependencies** – SANSa has been steadfast in its efforts to address the long-standing Houwteq facility ownership challenges, whilst viable mechanisms to ensure the project is not derailed continue to be explored.
- 7) **Slow pace of government bureaucracy could hamper SANSa's response to key opportunities** – SANSa will strengthen its relationship with the Department and be proactive in pursuing key opportunities. The identification of a political champion as part of the business remodelling exercise will contribute towards advocating and making the key opportunities more visible. Efficiencies and a hunger for progress will be facilitated within SANSa through fit for purpose policies and procedures, and effective team education.
- 8) **Funding instruments only fund Capex but exclude Opex** – A lifecycle asset management approach will be adopted in developing all business cases to provide for the operational expenditure that is needed to manage and maintain projects post establishment. Continual lobbying for operational support and the marketing of the resulting services will also be utilised to ensure sustainability.
- 9) **Loss of key SANSa skills to the external environment due to lack of opportunities to apply their skills** – the implementation of SIH and other key projects are critical to building capacity and sector capabilities. The positioning of SANSa as a centre of excellence in space-related applications and services will drive the development of key skills and contribute to a retention strategy.

1.2.5. STRATEGIC PRIORITIES INFORMING PLANNING FOR 2022/23

SANSa's 2022/23 APP is a further step on the strategic path of the organisation towards stimulating a capable and globally competitive South African space sector. As set in the 2020-2025 Revised Strategic Plan, SANSa's strategy is underpinned by several key success factors, including:

- 1) **Strategic partnerships/collaborations:**

SANSA strategic partnerships have been segmented into three, namely, national, African, and international. This is done as the policy and strategic drivers are different for each of these segments. The strategic plan will monitor the effectiveness of, and value derived from these partnerships.

2) **Strategic positioning of SANSA's programmes to enhance the Agency's competitiveness within the local, African, and global space sector:**

a) SANSA's future sustainability and growth depends on the repositioning of SANSA on four fronts:

- i) Refocusing SANSA's national initiatives to serve the broader Africa market, while continuing to address the needs of the local market.
- ii) Forging a stronger ecosystem approach that involves the development and participation of the local industry in strengthening and delivering on the space value chain.
- iii) Entering domain areas that to date have not been the purview of SANSA, such as Global Navigation Satellite Services (GNSS) and Telecommunications.
- iv) Pursuing aspirational initiatives that will bolster the service offerings of SANSA and significantly impact the development and transformation of the National Space Programme, such as the Space Infrastructure Hub, which includes the new Space Weather Centre, a new ground segment and a suite of satellites.

b) The growth opportunities require a systemic ecosystem approach:

- i) At a national level, towards a regional system of innovation approach on the African continent.
- ii) A more robust marketing and repositioning as a partner of choice in the global space industry.
- iii) This segmentation will further focus on the space and non-space sectors.

3) **Resource mobilisation strategies to ensure adequate financial and human resourcing of SANSA's strategic initiatives to support full delivery against its mandate:**

a) SANSA needs to move from a dependency on government funding in the light of dwindling budgetary allocations and fiscal pressures faced by the State. This should be achieved through the increased exploitation of the mandate and positioning as a key enabler and leader in space-based applications and technologies.

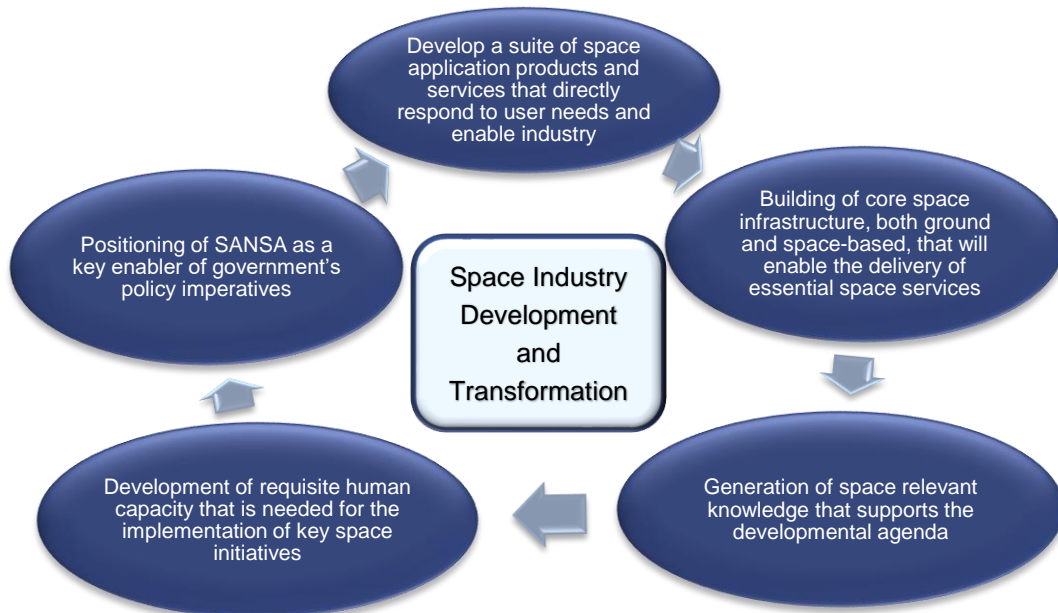
b) SANSA needs to re-evaluate its financial sustainability by considering other investment approaches and sources of funding that have not traditionally been explored by the Agency.

c) The organisation therefore needs to relook at the core skills that will be required in bringing this focus into the organisation, for example, capacity in writing funding proposals, including competencies in competitive pricing, financial modelling, bankable feasibility assessments and strategic financial planning and execution.

- d) Some of the current initiatives relating to the Space Infrastructure Hub, including the Space Weather Centre, provides a unique opportunity to start developing these in-house capabilities.

SANSA’s five-year strategic plan must pave the way for SANSA to achieve the following strategic priorities, to which this APP contributes:

Figure 3: Strategic priorities for the planning period



1) The development of a suite of space application products and services that directly respond to user needs and enable industry:

Space has a crucial role in providing operational applications/solutions that will address national/regional challenges and provide decision support tools for government. These include applications in natural resource management, climate change and environmental management, disaster management, rural development and urban planning, magnetic technology, aviation compliance, and national safety and security.

SANSA may develop some of these applications within the Agency, but the primary approach should be to leverage domain expertise externally. SANSA’s approach, therefore, should not be focused on implementing everything internally, but to focus on a few operational applications that require significant State investment and are not commercially viable for the private industry or are essentially public good services and therefore a State responsibility.

2) The building of core space infrastructure, both ground and space-based, that will enable the delivery of essential space services:

Infrastructure development forms the critical backbone for the South African space programme. This is especially important for the efficient and effective delivery of products and services, across the space value chain, through to the end users. SANSA will ensure

that there is seamless interfacing between its programmes across the space value chain so that its infrastructure operates in concert to deliver on national/regional requirements.

SANSA will take stock of the current infrastructure base and the future infrastructure requirements and plan accordingly to ensure an optimal infrastructure capacity that is adequately able to respond to user requirements both nationally and at a continental scale. SANSA will work with the local industry and other agencies on the continent to promote the infrastructure expansion required to respond to the growth potential of the African market.

3) The generation of space relevant knowledge that supports the developmental agenda:

SANSA firmly believes in the value of fundamental and applied science to create new knowledge that leads to new technologies and innovation that directly impact on the economy and society. Science also increases our knowledge and understanding of ourselves, our universe, and its sustainability. Therefore, SANSA will foster and lead collaborative R&D in space-related areas on a national scale. SANSA will set the national R&D agenda, its priorities, targets, and outcomes in line with this Strategic Plan. An appreciation for the value of fundamental research and its long-term benefits to the country will be fostered.

Through such R&D, provision will be made for the leadership, coordination, and support to applied research to increase the knowledge base, devise new applications through space missions, and allow the transfer of IP and enabling technologies to local industry, academia, and government organisations. Such interventions will ensure that South Africa remains on the cusp of cutting-edge space technologies and applications.

4) The development of requisite human capacity that is needed for the implementation of key space initiatives:

A significant increase in the interest towards Science, Technology, Engineering, Mathematics, and Innovation (STEMI) fields, as well as the development of rare and transferable skills are required to meet national demand for a viable space programme that can deliver against its targets. Capacity development in space-related areas will not only benefit space but will have an impact in other areas that require scientists, engineers, and technicians.

Skills development with a solution-driven mindset will be promoted, and space will be utilised as a driver to prepare the youth for the fourth industrial revolution. All capacity development initiatives should be conducted with a transformational agenda to redress inequality in terms of race, gender, and people with disabilities. Such initiatives will target the transformation of both the student cohort and the broader industry expertise base. These initiatives will ensure that the representative demographics is reflected in our local space initiatives.

5) The positioning of SANSA as a key enabler of government's policy imperatives

Government has articulated several key national priorities for the country, which are reflected in several policy instruments. An indication of the key priorities is included in Part A above, for which it must be noted that SANSA was established to assist the State in responding to these challenges. SANSA will reaffirm its position as an institute within the NSI that is effective in responding to the socio-economic environmental challenges of the country.

Rather than responding to the national priorities in a piecemeal fashion, as is currently the case, SANSa will position itself to respond more comprehensively to a larger proportion of these priorities in a more cost-effective and impactful manner. Such interventions will encompass using the existing capabilities and infrastructure, with the requisite marketing and business development focus, that supports a more structured approach.

Achieving and maintaining an unqualified audit outcome with no material matters, as well as working towards achieving industry best practice quality standards are further levers of SANSa's positioning as a leader of the national space sector value chain.

6) **Space ecosystem development and industry transformation**

Cutting across the above strategic priorities is SANSa's leading role in the development and transformation of the industry. SANSa aims at driving the space ecosystem through the thematic areas of earth observation, communications, navigation positioning and timing, and space exploration. SANSa will be finalising an Industry Development Implementation Plan that will be geared to affecting the required transformation of the sector. The transformation of the sector will be achieved through the following interventions, among others:

- a) Human capital development – prioritisation of historically disadvantaged individuals.
- b) Internships – placements in the industry.
- c) Contract management – subcontracting to new entrants and SMEs.
- d) Incentive schemes – support towards strengthening the upstream and downstream segments; and
- e) Adoption of the Fourth Industrial Revolution and big data in the space value chain.

1.2.6. SANSa INSTITUTIONAL REVIEW

In terms of the DSI Policy on Governance Standards for Science, Engineering and Technology Institutions (SETIs), institutional reviews of SETIs must be conducted every three to five years. This, however, has not been the case for SANSa as the Agency initiated its first ever institutional review since inception of the Agency during the 2021/22 financial year, covering a ten-year period from 2011/12 to 2020/21.

The retrospective institutional review seeks to determine the relevance, efficiency, and effectiveness of SANSa and progress made by the Agency since its inception towards achieving its objectives and mandate as provided for in the SANSa Act. It further seeks to ascertain the strategic positioning of SANSa's programmes, taking into consideration the evolving global space landscape and whether SANSa is optimally positioned within this landscape. The prospective outlook, on the other hand, will provide recommendations to enhance the performance of SANSa and its future orientation.

As at the end of the third quarter in the 2021/22 financial period, SANSa, with support from the NRF, had concluded the appointment of the International Review Panel, with expertise in the areas of Earth Observation, Space Science, Space Operations and Satellite Engineering. The next steps

to be undertaken in the final quarter of the 2021/22 financial year includes panel engagements with identified key stakeholders, site visits (where feasible) and the reporting of evaluation outcomes and recommendations to SANSa's governance structures and the Shareholder.



PART C: MEASURING OUR PERFORMANCE

1. INSTITUTIONAL PROGRAMME PERFORMANCE INFORMATION

SANSA is constituted by the following programmes, which informs the packaging of this Annual Performance Plan:

Table 5: SANSA programmes

Programme No.	Programme Purpose
Programme 1	<p>Administration</p> <p>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. The focus of the Administration Programme is 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 and sustainability of the Agency.</p>
Programme 2	<p>Earth Observation</p> <p>The Earth Observation (EO) programme is responsible for the development and promotion of Earth observations products for socio-economic development and improved livelihoods in South Africa and the African continent. The objective is to collect, assimilate and disseminate Earth observation data and products to support South Africa’s policymaking and implementation for socio-economic growth through areas that include food security, water resource management, integrated spatial planning and land reform, disaster management, peace and security, oceans economy and global change.</p>
Programme 3	<p>Space Science</p> <p>The Space Science (SS) Programme leads multidisciplinary 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 postgraduate science and engineering student training as well as science engagement including both learner and educator science support.</p>
Programme 4	<p>Space Operations</p>

Programme No.	Programme Purpose
	<p>The Space Operations (SO) 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 lifecycle 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.</p>
<p>Programme 5</p>	<p>Space Engineering</p> <p>The Space Engineering (SE) 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 subsystems 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.</p>

Informed by the legislative and policy mandates and strategic focus, the 2020-2025 Strategic Plan presents the impact statement of the South African National Space Agency as:

A sustainable South African space sector that contributes meaningfully to socio-economic development across the African continent

Listed below, the outcomes of the 2020-2025 Strategic Plan are aligned to MTSF 2019 - 2024:

- Outcome 1:** Increased space relevant knowledge that supports the developmental agenda
- Outcome 2:** Stimulated and growing, inclusive space sector
- Outcome 3:** Increased human capacity for the implementation of key space initiatives
- Outcome 4:** SANSa positioned as a key enabler for the implementation of government's space-related policies
- Outcome 5:** Enabling infrastructure developed and upgraded to support the space sector value chain
- Outcome 6:** Increased participation of the National Space Programme in the regional and global space market

The five programmes contribute to the attainment of the outcomes through programme level outputs, output indicators, and annual and quarterly targets, as reflected in the sections below.

1.1. PROGRAMME 1:



1.1.1. PROGRAMME 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. The focus of the Administration Programme is to ensure the Agency's mandate is efficiently and effectively executed, a strong focus on new business development, strategic leadership, 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.

In contributing towards the SANSa impact of **"A sustainable South African space sector that contributes meaningfully to socio-economic development across the African continent"**, the Administration Programme delivers against the following outcome and five-year targets in the approved Strategic Plan:

Outcome 4: SANSa positioned as a key enabler for the implementation of government's space-related policies

Outcome 2: Stimulated and growing, inclusive space sector

The 2022/23 Performance Plan of Programme 1 is reflected in the log frame tables below:

1.1.2. PROGRAMME 1: OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

Table 6: Administration Programme – Outcomes, outputs, output indicators and annual targets

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 4 SANSa positioned as a key enabler for the implementation of government's space-related policies	4.1. High-performance initiatives	4.1.1. Number of initiatives to transform SANSa into a high-performing Agency	-	-	4	2	2	3	3
	4.2. Audit actions implemented	4.2.1. Percentage implementation of Audit Action Plan <i>(internal and external audit)</i>	-	-	-	New indicator	95%	95%	95%
Outcome 2 Stimulated and growing, inclusive space sector	2.1. Targeted expenditure	2.1.1. Percentage operational expenditure spend on SMEs <i>(Note – Disaggregated in the TID)</i>	-	-	-	20%	30%	30%	30%

1.1.3. PROGRAMME 1: OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

Table 7: Administration Programme – Output indicators, annual and quarterly targets

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
4.1.1. Number of initiatives to transform SANSa into a high-performing Agency	2 (Change Management Process; Online Performance Management System)	-	-	-	Change Management process implemented (Feedback collection and analysis)
		-	-	Operational Online Performance Management System	-
4.2.1. Percentage implementation of Audit Action Plan	95%	25%	50%	75%	95%
2.1.1. Percentage operational expenditure spend on SMEs	30%	30%	30%	30%	30%

1.1.4. PROGRAMME 1: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The administration programme will play a significant role over the MTEF period in ensuring high-performance, efficiencies, reliable support to operations, compliance, and governance. This will involve service optimisation across the support areas and the utilisation of systems to improve work accuracy and automate processes. A change management process will be run across the organisation to realign the team with the new business model and other initiatives in the agency.

Several initiatives are planned to ensure that previously identified audit findings are resolved, and a clean external report is received. These include an Audit Action Plan and the continued implementation of the B-BEEE Strategy and Implementation Framework.

The focus of the programme is to:

- 1) Transform SANSa into a high-performing Agency through effecting changes in the enterprise, financial and supply chain support functions; and
- 2) Raise the brand value of SANSa.

By so doing, the key priorities are to:

- 1) Ensure efficiencies in terms of people, systems and processes.
- 2) Instil a culture of work discipline and high standards in the organisation.
- 3) Raise the brand visibility of SANSa.

The net impact of these outcomes is to (i) ensure that the socio-economic priorities of the country are achieved in a cost effective and sustainable manner, and (ii) the value proposition of space is understood by all South Africans.

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 financial sustainability the following will be undertaken:

- 1) A streamlined stakeholder engagement strategy will be developed and implemented.
- 2) A communications protocol including policies and processes aligned to the organisation's communication strategy will be developed.
- 3) Revenue enhancement strategies through new business development initiatives.
- 4) Cost recovery mechanism for value added services provided.

- 5) Asset infrastructure investment and monitoring to ensure continued provision of value-added services.

High-performance culture

The achievements of the SANSa outcomes 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:

- 1) Driving a high-performance culture through sound leadership, client / customer focus, stakeholder management and partnering, best practice business processes, and “living” the organisational values.
- 2) Implementing and driving an effective change management process within SANSa to ensure that alignment and buy-in is achieved to efficiently embed the change projects for a new SANSa way of working.
- 3) Rolling out an online performance management and development system with appropriate support and training to the line managers and supervisors.
- 4) Developing a workforce plan that demonstrates the skills requirements for the SANSa strategic framework and the new business model.
- 5) Building Management capability and skills.
- 6) Continuously improving SANSa’s business processes to ensure a continuous smooth workflow across units.
- 7) Embedding of new ICT systems including an Information Management Solution.
- 8) Legal services delivered in accordance with efficient service standards.
- 9) An effective and efficient compliance function that contributes to improved corporate governance.

PRIORITIES RELATING TO WOMEN, YOUTH AND PEOPLE WITH DISABILITIES:

The prioritisation of women, youth and people with disabilities is included in the B-BBEE strategy. The focus areas are preferential procurement, science engagement and advancement, supplier development, skills development, and employment equity. A concerted effort will be made to increase the participation of people with disabilities in SANSa’s programmes and structures.

The performance management system includes talent management initiatives, and employee personal development goals that allow employees to enhance their skills sets and contribute to a wider SANSa.

Various other initiatives will be run over the MTEF to provide internship and volunteer programmes as well as exchange and study assistance. These are all designed to foster and grow the skills and capacity SANSa needs for the strategic plan implementation and the aim of ensuring a high-performing agency.

1.1.5. PROGRAMME 1: RESOURCE CONSIDERATIONS

Table 8: Administration Programme – Revenue estimates

Administration	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21	2021/22	2021/22	2021/22	2022/23	2023/24	2024/25	
REVENUE											
Revenue from Non - Exchange Transactions		54 672 337	53 972 349	58 599 989	66 339 083	-	66 339 083	49 060 289	52 171 517	54 263 214	155 495 020
Operational Transfers		53 785 359	53 263 334	56 609 797	66 339 083	-	66 339 083	49 060 289	52 171 517	54 263 214	155 495 020
Parliamentary Grant		53 785 359	53 263 334	56 609 797	66 339 083	-	66 339 083	49 060 289	52 171 517	54 263 214	155 495 020
Ring fenced Grants		886 978	709 016	1 990 192	-	-	-	-	-	-	-
Outreach Program (IAC and Science)		886 978	-	-	-	-	-	-	-	-	-
Grant Income - Outreach		-	709 016	-	-	-	-	-	-	-	-
Satellite Development Programme		-	-	1 990 192	-	-	-	-	-	-	-
Revenue from Exchange Transactions		6 329 475	6 215 765	3 776 627	2 705 098	37 729 598	40 434 697	4 277 199	4 465 396	4 459 681	13 202 276
Other Income		6 329 475	6 215 765	3 776 627	2 705 098	-	2 705 098	4 277 199	4 465 396	4 459 681	13 202 276
Interest Income		6 329 524	6 451 110	2 911 075	2 705 098	-	2 705 098	4 277 199	4 465 396	4 459 681	13 202 276
Other Income		-	356	865 552	-	-	-	-	-	-	-
Net Gains on Foreign exchange transactions		(48)	(235 701)	-	-	-	-	-	-	-	-
Commitments		-	-	-	-	37 729 598	-	-	-	-	37 729 598
Total Revenue		61 001 813	60 188 114	62 376 616	69 044 181	37 729 598	106 773 779	53 337 488	56 636 913	58 722 895	168 697 295

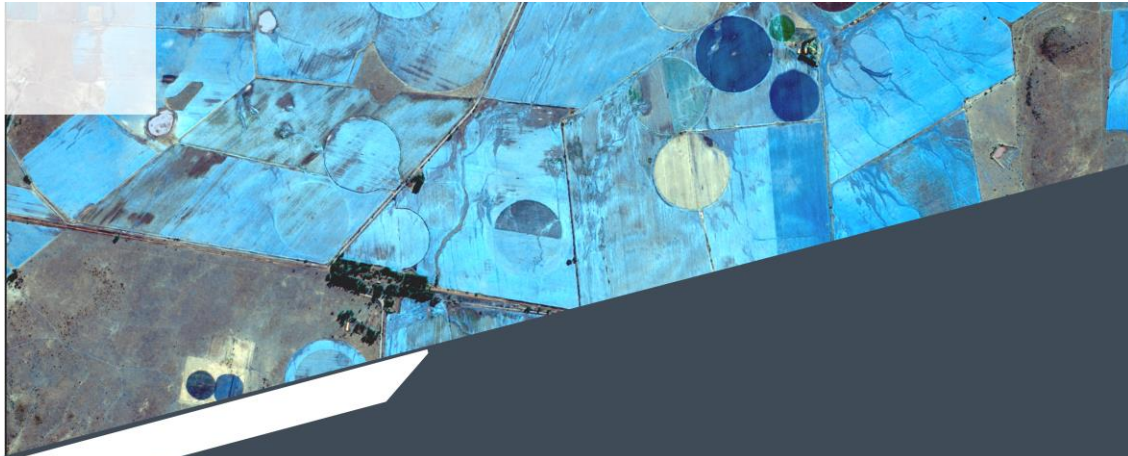
Table 9: Administration Programme – Expenditure estimates

Administration	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21	2021/22	2021/22	2021/22	2022/23	2023/24	2024/25	
Grants and Subsidies Paid		48 000	-	-	-	-	-	-	-	-	-
Training Expenses		211 781	765 650	841 460	486 236	1 817 214	2 303 449	486 236	486 236	507 873	1 480 344
General Expenses		14 611 102	16 542 257	19 804 731	31 129 607	22 579 815	53 709 421	12 196 219	13 535 483	13 461 562	39 193 264
Net Losses on foreign exchange transactions		1 297	-	(65 485)	-	-	-	-	-	-	-
Loss on Disposal of Property, Plant and Equipment		18 353	114 388	59 588	-	-	-	-	-	-	-
Total Operating Expenditure		51 209 365	51 582 207	60 101 127	68 622 181	30 646 419	99 268 600	52 895 232	56 175 198	58 222 895	167 293 324
Capital Expenditure		-	3 183 595	1 996 942	422 000	7 083 180	7 505 180	442 256	461 715	500 000	1 403 971
Buildings and other fixed structure		-	93 189.00	-	-	-	-	-	-	-	-
Machinery and equipment		-	109 939	6 750	-	-	-	-	-	-	-
Computer Equipment		-	435 466	-	422 000.00	4 583 179.96	5 005 179.96	442 256.00	461 715.26	500 000.00	1 403 971
Software and intangible assets		-	2 545 001	-	-	1 000 000.00	1 000 000.00	-	-	-	-
Vehicles		-	-	-	-	1 500 000.00	1 500 000.00	-	-	-	-
AIT Facility		-	-	-	-	-	-	-	-	-	-
Concurrent Design Facility*		-	-	-	-	-	-	-	-	-	-
Satellite Development		-	-	1 990 192	-	-	-	-	-	-	-
Total Expenditure		51 209 365	54 765 802	62 098 070	69 044 181	37 729 599	106 773 780	53 337 488	56 636 913	58 722 895	168 697 295

The average budget for the Administration programme is R56 million, which is derived from the Parliamentary Grant and interest income.

The average employee costs are R38 million over the Medium-Term Expenditure Framework (MTEF) period, which includes a nominal salary increase based on the Consumer Price Index (CPI). Other expenses include administration costs and support services.

1.2. PROGRAMME 2:



EARTH OBSERVATIONS PROGRAMME

1.2.1. PROGRAMME PURPOSE

The Earth Observation (EO) programme provides for the development and promotion of Earth observations products for socio-economic development and improved livelihoods in South Africa and the African continent. The objective is to collect, assimilate and disseminate Earth observation data and products to support South Africa’s policymaking and implementation for socio-economic growth through areas that include food security, water resource management, integrated spatial planning and land reform, disaster management, peace and security, oceans economy and global change.

The programme’s core function is geared towards implementation of the SAEOSS, which requires the contribution of all players in the EO value chain, which include academia, research councils, private sector and government departments and their entities, collectively forming the Earth Observation sector. International partnerships through initiatives, such as AfriGEO, ARMC, Group on Earth Observations (GEO), the Committee on Earth Observation Satellites (CEOS), and various bilateral and multilateral agreements, are required to stimulate the growth of local Earth observation capabilities. The EO Programme will use this coordination and facilitation role to position the South Africa EO sector as a regional nucleus for innovative space solutions. Critical to achieving this objective is broad stakeholder consultations to be realised through focused, systematic and tailored engagements. These ‘listening posts’ include direct interaction with stakeholders, establishment and engagement with NEOSS through its Communities of Practice, the annual Space for National Development Symposium, EO interaction with ZASpace Inc (industry association), through various workshops and surveys.

In contributing towards the SANSa impact of **“A sustainable South African space sector that contributes meaningfully to socio-economic development across the African continent”**, the EO Programme delivers against the following outcome and five-year targets in the approved Strategic Plan:

Outcome 1: Increased space relevant knowledge that supports the developmental agenda.

Outcome 3: Increased human capacity for the implementation of key space initiatives.

Outcome 4: SANSa positioned as a key enabler for the implementation of government's space-related policies.

Outcome 5: Enabling infrastructure developed and upgraded to support the space sector value chain.

Outcome 6: Increased participation of the National Space Programme in the regional and global space market.

The 2022/23 Performance Plan of Programme 2 is reflected in the log frame tables below:

1.2.2. PROGRAMME 2: OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

Table 10: Earth Observation Programme – Outcomes, outputs, output indicators and annual targets

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 1 Increased space relevant knowledge that supports the developmental agenda	1.1. National research and development output in space-related sciences	1.1.1. National research productivity score for supported R&D	375	511	567.44	300	345	415	500
Outcome 3 Increased human capacity for the implementation of key space initiatives.	3.1. Youth awareness of space-related sciences	3.1.1. Number of youth directly engaged on space-related sciences	16 497	25 648	2 660	16 125	30 000	35 000	40 000
	3.2. Students and interns supported	3.2.1. Number of students and interns supported for formalised training	15	22	20	20	28	36	40
Outcome 4: SANSa positioned as a key enabler for the implementation of government's	4.3. Joint space programme initiatives undertaken through partnerships	4.3.1. Number of joint initiatives undertaken through formal international partnerships	-	-	-	5	5	5	6
		4.3.2. Number of joint initiatives	-	-	-	5	6	7	8

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
space-related policies		undertaken through formal African partnerships							
		4.3.3. Number of joint initiatives undertaken through formal National partnerships	-	-	-	8	9	10	12
	4.4. Awareness and training to key users of space-related products and services	4.4.1. Number of awareness and training interventions to key users of space-related products and services	-	-	5	5	5	5	6
	4.5. Government departments and public entities using space products and services	4.5.1. Number of additional government departments and public entities that are using space products and services	-	-	-	Indicator reframed	10	10	10
Outcome 5 Enabling infrastructure developed and	5.1. Infrastructure developed or upgraded	5.1.1. Development of Digital Earth South Africa	-	-	Ingestion of SPOT archive	Ingestion of Landsat archive	An operational Digital Earth South Africa	An operational Digital Earth South Africa	An operational Digital Earth South Africa

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
maintained to support the space sector value chain		5.1.2. Development of the Space Infrastructure Hub (SIH)	-	-	-	Conclusion of a feasibility study for a bankable project	Initiate acquisition of the Phase-1 mission system	Conclude acquisition of the Phase-1 mission system	Launch and in-orbit testing of Phase-1 satellites (including development of downstream applications)
Outcome 6 Increased participation of the national space programme in the regional and global space market	6.1. Space products and applications	6.1.1. Number of products and applications	-	-	2	3	3	3	3

1.2.3. PROGRAMME 2: OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

Table 11: Earth Observation Programme – Output indicators, annual and quarterly targets

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
1.1.1. National research productivity score for supported R&D	345	-	172.5	-	172.5

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
3.1.1. Number of youth directly engaged on space-related sciences	30 000	6 000	12 000	6 000	6 000
3.2.1. Number of students and interns supported for formalised training	28	28	-	-	-
4.3.1. Number of joint initiatives undertaken through formal international partnerships	5	2	-	1	2
4.3.2. Number of joint initiatives undertaken through formal African partnerships	6	2	-	2	2
4.3.3. Number of joint initiatives undertaken through formal National partnerships	9	5	-	2	2
4.4.1. Number of awareness and training interventions to key users of space related products and services	5	1	1	2	1
4.5.1. Number of additional government departments and public entities that are using space products and services	10	2	3	3	2
5.1.1. Development of Digital Earth South Africa	Ingestion of additional (1) sensor	-	-	-	Ingestion of additional (1) sensor
5.1.2. Development of the Space Infrastructure Hub (SIH)	Initiate acquisition of the Phase-1 mission system	Finalise user requirements and mission definition	Approved mission system specification	Initiate contracting of the space system	Finalisation of contracting for acquisition of the Phase-1 mission system

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
6.1.1. Number of products and applications	3	-	-	-	3 (Products/Services delivered within the following areas: Data as a Service, Remote Sensing Products, Infrastructure as a Service)

1.2.4. PROGRAMME 2: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The focus of the programme is to:

- 1) Maintain a long-term archive of satellite data for national benefits that is essential for change detection for better understanding environmental change in time and space.
- 2) Provide state-of-the-art data infrastructure for the delivery of essential Earth observation services.
- 3) Provide sector development through partnerships for learning (human capital development), growth, transformation, and competitiveness.
- 4) Manage product and services to maturity to meet user information needs.
- 5) Market Earth observations for understanding, creating, and delivering profitable value to customers.
- 6) Transact at the cutting edge of global knowledge through research, development, and innovation.
- 7) Implement the Space Infrastructure Hub (SIH) project.

In so doing, the key priorities are to:

- 1) Provide a coordinated procurement of satellite data for government and its entities.
- 2) Provide world class operational EO data infrastructure through (i) implementation of Earth Observation Data Centre (EODC) and SAEOS portal, (ii) enabling delivery of essential information products and services, (iii) stimulating local industry and scientific development, and (iv) ensuring the long-term retention of EO data. In so doing:
 - a) Provide fit-for-purpose and efficient products, services and decision support tools that can support the District Development Model, agriculture and food security, water resource management, integrated spatial planning and land reform, disaster management, peace and security, global change and oceans and coastal zone management.
- 3) Establish a coordinated national EO research agenda.
- 4) Create an understanding of the national and global marketplace and positioning South Africa to capture a market share.
- 5) Ensure an organised, networked, and coordinated sector.
- 6) Promote an inclusive, growing and increasingly competitive industry.
- 7) Enrich public and youth understanding of Space Science and Science, Technology, Engineering, Mathematics, and Innovation (STEMI).
- 8) Develop a skilled and informed sector.

- 9) Establish national, continental, and international partnerships informing growth.

ADDRESS SOUTH AFRICA'S CHALLENGES THROUGH SPACE SERVICES AND PRODUCTS:

Application products and services

The Earth Observations Programme will ensure the development and implementation of operational EO applications with high socio-economic benefit. It, therefore, focuses on the final destination of the space value-chain, i.e., products and services. These applications will be developed and implemented by collaboration between SANSA, research councils, universities, private sector, and government departments and entities to ensure that the full suite of national capabilities are deployed.

Based on analysis of government priorities, understanding of existing broad user requirements and existing 'low-hanging fruit' capability of the South African EO sector, the programme will initially focus on seven application areas, namely:

- 1) Agriculture and food security.
- 2) Water resource management.
- 3) Integrated spatial planning (incl. infrastructure monitoring) and land reform.
- 4) Disaster management.
- 5) Peace and security.
- 6) Global change.
- 7) Oceans and coastal zone management (towards blue economy).

These application areas represent priorities that address a very wide range of societal benefits, for actual products and services, further definition of user requirements will be undertaken with the user communities, to ensure response to immediate needs and challenges.

Data Infrastructure for the delivery of essential Earth observation services

Earth Observation Infrastructure development (direct data reception, data processing, long-term data archiving and data distribution) forms a critical backbone for the growth and competitiveness of the South African Earth Observation Programme. It is a unique system level value-add that SANSA is able to provide, by virtue of its mandate, to the South African Earth Observations Community. Provision of such national level infrastructure is especially important for the efficient and effective delivery of data, value-added products, and services to unlock socio-economic impact, stimulate innovation, grow industry, and access new markets.

An approach favoured by SANSA to realise this goal is the establishment of a High-Performance Computing Centre for operational Earth observations, enabled for 'big data' processing and with the capacity to provide Cloud-based services. Cloud computing and advanced machine learning will enable better scalability to accommodate information requirements beyond 2030, facilitate enhanced and ubiquitous access to space-based Earth observation data and services, and promote a focused data analytics and data systems research programme.

The initial vehicle to achieve this ambition is through the development of a data cube, namely Digital Earth South Africa (DESA). DESA aims to optimise the existing SANSa Earth Observation Data Centre towards the delivery of a unique capability to process, interrogate, and present SANSa's portfolio of archived satellite imagery, dating as far back as 1972.

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.

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

The future success of South Africa's EO ecosystem to innovate and transact is dependent on proactive and collaborative R&D to address knowledge gaps and create new knowledge throughout the EO value chain. It is fundamental for South Africa to develop a coordinated national Earth observations research agenda that is facilitated by SANSa, overseen by a multi-stakeholder Research Advisory Group, and implemented in collaboration with universities, science councils, local Industry, and the international community.

This research agenda must, in the first instance, span fundamental to applied research in EO and be aimed at increasing South Africa's research output, contribution to global knowledge and intellectual property stocks across the EO value chain. Secondly, the research agenda should be aimed at developing indigenous solutions that address both local and global challenges. Thirdly, the research agenda must be geared towards creating an innovative and competitive South African industry. An intentional connection between the researchers and entrepreneurs is to be established through the Space Cluster initiative.

Enhance the competitiveness of the South African space industry

Creating a sustained inclusive growth in the South African EO sector that is cognisant of transformation imperatives will require coordination amongst different stakeholders, which is best achieved through a cluster approach. A coordinated approach, that specifically explores the research, development, and innovation ambitions of South Africa, will allow for strategic impact – currently, efforts are non-directed and therefore do not achieve defined national priorities. A variety of space clusters have been established across the world, with significant benefits for their host countries, creating tens of thousands of jobs and spinning out numerous companies that have global coverage. The cluster approach will allow for a focused human capital development programme from learner to professional development and entrepreneurship, thereby building a truly indigenous space capability in both the private and the public sectors, taking *“South Africa to Africa and the world”*.

Further, SANSa will lead the South African Earth Observation Open Innovation Challenge in collaboration with various partners in the industry development value chain, as well as run a coordinated call for proposals under the national research, development, and innovation fund to drive the development of fit-for-purpose products and services.

Development of the Space Infrastructure Hub (SIH)

The Space Infrastructure Hub (SIH) will allow for the development of satellite infrastructure, satellite-based augmentation systems, earth observation and space weather satellites. Domestic access to this type of infrastructure will reduce South Africa's reliance on other countries for the

type of information that these satellites can make available and is expected to reduce the timeframes for collecting necessary data. It will provide information that might be used to develop products and services that can allow targeted responses to the socio-economic and infrastructure challenges South Africa must face.

The SIH is an ambitious and first of its kind National Space Programme for South Africa. After consideration of the resources (financial, time and human capacity), as well as technology development process required to achieve SIH, a phased implementation approach will be followed. In order to make it more feasible the programme will be implemented in phases with the first phase (Phase-1) focussing on the first mission consisting of a constellation of potentially three spacecraft.

The Space Infrastructure Hub Phase-1 will be implemented in the period up to 2025. The focus of this period is the specification, manufacture, and launch of at least three spacecraft in support of the user requirement for the space value chain. The expected period to complete the manufacture of the spacecraft is eighteen months. In 2022/23 the focus will be on the sourcing of the required funding in support of the first phase of the project. The user requirement will be completed and used as the main input to the specification of the mission. This mission will be an acquisition project. Once the specification is completed the tender process for the spacecraft will be launched to place contracts for the realisation of the Phase-1 mission. It is expected that this process will be completed by the end of 2022/2023.

Develop national human capacity and ensure transformation

A vibrant human capital development programme that builds in existing capability will be implemented in 2021/22. 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 to be targeted in all the training and funding interventions. Professional development support will be provided through short training courses and direct engagements with professionals in the EO sector.

The Science Engagement services will be implemented within the context of the national space awareness programme with the purpose to stimulate space science and technology interest in the public and demonstrate the value STEMI plays in society. The target audience engaged is aligned with the eleven identified segments of the public in the DSI's Science Engagement Framework intended to improve the coordination of and encourage science promotion, communication, and engagement activities.

Develop active partnerships

SANSA will proactively collaborate with national and international partners across the Earth observation value chain to deliver on its strategic outcomes and improve the range and quality of its product and service to its clients. At a national level SANSA will partner and collaborate with institutions in the National System of Innovation such as research councils, universities and partners 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 (AU) Commission. Agency to Agency collaborations will be strengthened with agencies participating in the ARMC, CEOS, and BRICS Constellation partnerships. SANSA will play a greater role in coordinating national Earth observation through GEO and AfriGEO. Partnerships will be actively pursued to increase the impact in research and development, data supply, human capital development, and stimulation of the space industry.

PRIORITIES RELATING TO WOMEN, YOUTH AND PEOPLE WITH DISABILITIES:

The EO Programme will translate SANSa’s strategic intent of empowering women, youth, and people with disabilities through embedding these priorities in its NEOfFrontiers Research Grant Programme, acquisition of products and in the development of its data systems platforms. These aspects are viewed critical for enabling an inclusive and transformed EO sector.

It is recognised that these efforts will need focused intention and will not be achieved overnight. Hence, in addition to directing its financial instruments, the EOP, will strengthen its human capital and outreach activities geared towards WYPWDs, building on SANSa’s Bursary Programme, science engagement activities, and annual EO innovation challenge.

1.2.5. PROGRAMME 2: RESOURCE CONSIDERATIONS

Table 12: Earth Observation Programme – Revenue estimates

Rand	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21	2021/22	2021/22	2021/22	2022/23	2023/24	2024/25	
REVENUE											
Revenue from Non - Exchange Transactions		69 414 254	83 093 367	64 429 083	82 071 115	(1 195 353)	80 875 763	81 452 498	88 520 281	92 822 810	262 795 589
Operational Transfers		40 676 775	35 731 342	34 257 290	36 321 115	-	36 321 115	34 452 498	34 520 281	36 322 810	105 295 589
Parliamentary Grant		40 676 775	35 731 342	34 257 290	36 321 115		36 321 115	34 452 498	34 520 281	36 322 810	105 295 589
Ring fenced Grants		28 737 479	47 362 025	30 171 793	45 750 000	(1 195 353)	44 554 647	47 000 000	54 000 000	56 500 000	157 500 000
Operation Phakisa - Ocean and Coast SAR data		28 737 479	27 367 105	25 040 945	29 000 000	(14 500 000)	14 500 000	27 000 000	30 000 000	30 000 000	87 000 000
Observation Systems of Systems Secretariat		-	1 488 022	-	-	-	-	-	-	-	-
EO RDI Fund		-	700 000	2 403 270	16 000 000	-	16 000 000	20 000 000	24 000 000	26 500 000	70 500 000
EO Public Awareness		-	719 550	-	750 000	287 241	1 037 241	-	-	-	-
Def Grant -IASSTI For SA		-	636 673	252 195	-	1 118 767	1 118 767	-	-	-	-
EO Data & Infrastructure		-	16 450 675	2 475 384	-	-	-	-	-	-	-
SAEOSS Portal		-	-	-	-	1 690 079	1 690 079	-	-	-	-
Earth Observation Data Centre		-	-	-	-	8 696 210	8 696 210	-	-	-	-
DST Afrigeos		-	-	-	-	1 512 350	1 512 350	-	-	-	-
Revenue from Exchange Transactions		16 877 410	11 688 361	5 240 706	8 996 000	16 709 594	25 705 594	8 486 000	8 506 000	8 536 000	25 528 000
Rendering of Services		16 696 429	11 274 693	4 607 740	8 796 000	-	8 796 000	8 286 000	8 306 000	8 336 000	24 928 000
Contract Revenue - Public Sector		14 695 190	9 182 312	4 324 835	6 586 000	-	6 586 000	6 586 000	6 586 000	6 586 000	19 758 000
Contract Revenue - Private Sector		323 084	224 100	262 500	210 000	-	210 000	200 000	220 000	250 000	670 000
Contract Revenue - Foreign		1 678 156	1 868 281	20 405	2 000 000	-	2 000 000	1 500 000	1 500 000	1 500 000	4 500 000
Other Income		180 980	413 668	632 966	200 000	-	200 000	200 000	200 000	200 000	600 000
Interest Income		246 155	254 377	132 346	200 000	-	200 000	200 000	200 000	200 000	600 000
Other Income		7 430	176 716	500 620	-	-	-	-	-	-	-
Net Gains on Foreign exchange transactions		(72 604)	(17 425)	-	-	-	-	-	-	-	-
Commitments						16 709 594	16 709 594				33 419 188
Total Revenue		86 291 664	94 781 728	69 669 789	91 067 115	15 514 241	106 581 357	89 938 498	97 026 281	101 358 810	288 323 589

Table 13: Earth Observation Programme – Expenditure estimates

Rand	Note	Audited Outcomes			Original Budget 2021/22	Adjustment 2021/22	Revised Budget 2021/22	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21				2022/23	2023/24	2024/25	
Expenditure											
Employee Related Costs - CTC		22 645 100	20 347 134	17 970 547	23 617 098	-	23 617 098	42 173 478	44 050 198	46 490 579	132 714 255
Incentive Bonus Provision		-	-	-	1 853 520	-	1 853 520	3 309 864	3 457 153	3 648 679	10 415 697
Board Member Remuneration		-	-	-	-	-	-	-	-	-	-
Depreciation and Amortisation		7 787 341	1 057 210	3 087 556	-	-	-	-	-	-	-
Repairs and Maintenance		2 818 030	1 158 546	2 255 925	1 350 000	1 000 000	2 350 000	1 350 000	1 350 000	1 410 075	4 110 075
Finance Costs		-	-	-	-	-	-	-	-	-	-
Data Licence fees		28 737 479	37 362 760	29 314 713	37 190 401	(15 500 000)	21 690 401	16 263 303	18 764 984	23 445 409	58 473 696
Grants and Subsidies Paid		32 241	1 559 878	2 685 465	16 000 000	18 772 939	34 772 939	20 000 000	22 000 000	20 000 000	62 000 000
Antenna Infrastructure Services		-	703 333	-	-	-	-	-	-	-	-
Training Expenses		524 316	733 393	485 925	1 600 000	500 000	2 100 000	1 600 000	1 500 000	1 350 000	4 450 000
General Expenses		3 878 981	4 682 798	2 277 453	4 087 479	3 131 406	7 218 885	4 241 853	4 403 946	4 574 143	13 219 942
Net Losses on foreign exchange transactions		-	-	27 253	-	-	-	-	-	-	-
Irrecoverable Sundry Debtors		-	543 827	8 416 559	-	-	-	-	-	-	-
Equipment		-	48 097	-	-	-	-	-	-	-	-
Total Operating Expenditure		66 423 488	68 196 976	66 521 395	85 698 498	7 904 345	93 602 843	88 938 498	95 526 281	100 918 885	285 383 665
Principal/Agent Transfers		-	-	-	-	-	-	-	-	-	-
Surplus / (Deficit) for the year		19 868 176	26 584 752	3 148 394	5 368 617	7 609 897	12 978 514	1 000 000	1 500 000	439 925	2 939 925
Capital Expenditure											
Buildings and other fixed structures		-	16 490 050	5 212 315	5 368 617	7 609 896	12 978 514	1 000 000	1 500 000	439 925	2 939 925
Machinery and equipment		-	236 880	-	-	-	-	-	-	-	-
Computer Equipment		-	11 612 995	3 909 655	3 500 000,00	6 802 412,92	10 302 412,92	1 000 000,00	1 500 000,00	439 925,13	2 939 925,13
Software and intangible assets		-	4 640 175	1 302 660	1 868 617,34	807 483,55	2 676 100,89	-	-	-	-
Total Expenditure		66 423 488	84 687 026	71 733 710	91 067 115	15 514 241	106 581 357	89 938 498	97 026 281	101 358 810	288 323 590

The Earth Observation Programme’s projected budget is an average of R96 million over the MTEF period, which is mainly funded by the Parliamentary Grant, Operation Phakisa and the EO RDI fund. The average employee costs are R47.7 million over the MTEF period. Further project expenses include data license fees, grant payments, capital expenditure and general expenditure to support operations.

1.3. PROGRAMME 3:



1.3.1. PROGRAMME PURPOSE

The Space Science (SS) Programme leads multidisciplinary 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 postgraduate science and engineering student training, as well as science engagement through both learner and educator science support.

In contributing towards the SANSa impact of **“A sustainable South African space sector that contributes meaningfully to socio-economic development across the African continent”**, the Space Science Programme delivers against the following outcome and five-year targets in the approved Strategic Plan:

Outcome 1: Increased space relevant knowledge that supports the developmental agenda

Outcome 3: Increased human capacity for the implementation of key space initiatives

Outcome 4: SANSa positioned as a key enabler for the implementation of government's space-related policies

Outcome 5: Enabling infrastructure developed and upgraded to support the space sector value chain

Outcome 6: Increased participation of the National Space Programme in the regional and global space market

The 2022/23 Performance Plan of Programme 3 is reflected in the log frame tables below:

1.3.2. PROGRAMME 3: OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

Table 14: Space Science Programme – Outcomes, outputs, output indicators and annual targets

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 1 Increased space relevant knowledge that supports the developmental agenda	1.1. National research and development output in space-related sciences	1.1.1. National research productivity score for supported R&D	1 460	1 254	1 337	1 000	1 100	1 300	1300
Outcome 3 Increased human capacity for the implementation of key space initiatives.	3.1. Youth awareness of space-related sciences	3.1.1. Number of youth directly engaged on space-related sciences	7 840	10 858	277	5 000	7 250	7 500	8000
	3.2. Students and interns supported	3.2.1. Number of students and interns supported for formalised training	28	25	25	21	28	36	40
Outcome 4: SANSa positioned as a key enabler for the implementation of government's space-related policies	4.3. Joint space programme initiatives undertaken through partnerships	4.3.1 Number of joint initiatives undertaken through formal international partnerships	-	-	5	3	3	3	5
		4.3.2 Number of joint initiatives undertaken	-	-	8	3	3	3	5

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
		through formal African partnerships							
		4.3.3. Number of joint initiatives undertaken through formal National partnerships	-	-	7	3	3	3	5
	4.4. Awareness and training to key users of space-related products and services	4.4.1. Number of awareness and training interventions to key users of space-related products and services	-	-	4	3	3	3	6
Outcome 5 Enabling infrastructure developed and maintained to support the space sector value chain	5.1. Infrastructure developed or upgraded	5.1.3. Percentage progress towards a new operational space weather centre, as per an approved Business Case	-	-	42.8%	70%	100%	Operational Space Weather Centre maintained at 75%	Maintain Operational Space Weather Centre maintained at 90%
Outcome 6 Increased participation of the National Space Programme in the regional and	6.1. Space products and applications	6.1.1. Number of products and applications	-	-	2	2	2	2	2

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
global space market									

1.3.3. PROGRAMME 3: OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

Table 15: Space Science Programme – Output indicators, annual and quarterly targets

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
1.1.1. National research productivity score for supported R&D	1 100	300	200	300	300
3.1.1. Number of youth directly engaged on space-related sciences	7 250	1 450	2 000	2 050	1 750
3.2.1. Number of students and interns supported for formalised training	28	28	-	-	-
4.1.2 Number of joint initiatives undertaken through formal international partnerships	3	1	-	1	1
4.1.3. Number of joint initiatives undertaken through formal African partnerships	3	1	-	1	1

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
4.1.4. Number of joint initiatives undertaken through formal National partnerships	3	1	-	1	1
4.2.1. Number of awareness and training interventions to key users of space-related products and services	3	1	1	-	1
5.1.3. Percentage progress towards a new operational space weather centre, as per an approved Business Case	100%	-	-	100%	-
6.1.1. Number of products and applications	2	-	-	-	2 (Products / Services delivered within the following areas: Magnetic Technology Services and Space Weather Services)

1.3.4. PROGRAMME 3: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The Space Science Programme will continue to focus on providing a research, development, and service platform; conducting collaborative and multidisciplinary cutting-edge research; provide technology and applied science services for government and industry users; and initiate, coordinate and run human capacity development and science engagement programmes.

The focused important goal for the programme over the medium-term period is to “*operationalise space weather*”, ensuring that SANSa is able to provide 24/7 operational space weather services to the African region by the end of 2022/23; and that this newly established capability is maintained and integrated into SANSa’s core offerings thereafter. Through this goal the programme will increase the value of space science in the country, derive economic benefits, provide a national infrastructure platform, contribute the knowledge economy, fill the expertise gap, and create opportunities and partnerships.

The focus of the programme is to:

- 1) Install and maintain infrastructure for operational services and for R&D.
- 2) Generate knowledge to advance our understanding of the near-Earth space environment.
- 3) Develop products and services in accordance with the requirements of our clients.
- 4) Develop human capital to advance the above and meet the skills need of the country.
- 5) Create engagement, awareness and appreciation of science, engineering, and technology amongst youth and the public.
- 6) Develop and maintain national, regional, and international partnerships.
- 7) Participate in international fora on an expert level, such as in the United Nations and International Civil Aviation Organisation (ICAO) related committee meetings.

In so doing, the key priorities are:

- 1) Creation of new knowledge, developing knowledge economy, providing foundation for enhancement of understanding, and development of applications.
- 2) Contribution to safety and security through the provision of magnetic information and technology solutions for the region.
- 3) Maintaining a world class facility that provides unique infrastructure to the nation - contributing to government priorities, knowledge economy, space industry, and regional reach.
- 4) Provision of a national southern oceans and polar regions platform that facilitates new science, new applications, and paves the way for improved space weather products and services. This, in turn, will impact the ability to provide early warnings that then allow for mitigation measures to be put in place.
- 5) Human capital development and science engagement in space science related fields.

- 6) Contributing towards the broader strategic outcome of ensuring an “*Increased share of the space products and applications market*” for SANSa.

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 listed below.

- 1) *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, 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.
- 2) *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.
- 3) *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 affecting the transport, mining and agriculture sectors.
- 4) *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.
- 5) *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, depend 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.
- 6) *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 onboard planes, particularly long-haul flights because they fly at higher altitudes. The aviation industry requires space weather products that assist with flight planning and the ICAO have implemented regulations, including the requirement to provide space weather information in all flight plans. SANSa has received designation as the aviation space weather information provider for Africa and is assisting the aviation sector in space weather preparedness.
- 7) *Other sectors*: Space weather can have disastrous impacts on the systems utilised within the agriculture, mining, transport, and mobile communication sectors. SANSa will be working

with these sectors to quantify the impact and create awareness of the use of space weather information in protecting vulnerable technology systems.

SANSA operates the Space Weather Regional Warning Centre for Africa, which forms part of the International Space Environment Service (ISES). SANSA's Space Weather 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 SANSA Space Weather 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. The Space Weather Centre will move to a 24/7 service during the 2022/23 financial year providing information to a wide range of sectors ensuring early mitigation for the vulnerabilities created by space weather phenomena. Priorities for 2022/23 include:

- 1) Continued development within the space weather product and service portfolio.
- 2) The completion of the 24/7 operational space weather services project as per the approved business case.
- 3) Delivery of products and services to clients, and enhanced marketing efforts for the portfolio.
- 4) Verification of space weather forecasts and predictions; and
- 5) Research into appropriate space weather related products and services, as well as impacts.

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, maritime and aviation sectors. Priorities for 2022/23 include:

- 1) Continued provision of support services to the defence, aviation, and maritime sectors.
- 2) Enhanced provision of magnetic related services to the space industry and increased marketing and awareness efforts for the magnetic technology portfolio.
- 3) An increased focus on magnetic sensor integration.
- 4) The provision of magnetic technology services to the national and international space community.

Increased space-relevant knowledge that supports the developmental agenda Conduct space science research and create new knowledge and a better understanding of the universe and the near-Earth space environment. SANSa operates a wide and multifaceted 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 instrumentation network is being expanded into Africa to ensure a quality near real-time database as a regional knowledge and operational platform.

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. Successful research proposals, international standing of SANSa's researchers, and co-authored international publications also enhance SANSa's reputation as a credible knowledge institution.

Priorities for 2022/23 include:

- 1) The growth of Solar Physics as a research field in South Africa.
- 2) The expansion of the African Instrumentation Network to enhance the research and data platform.
- 3) Support for the Operational Space Weather Centre through credible know-how and research capability.
- 4) The collaboration with academic partners throughout the world in space environment related research projects.

Increased human capacity for the implementation of key space initiatives Science engagement will focus on increasing reach within 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, and university partnerships. The Space Science Programme will continue to lead and enhance the Student Development Programme for SANSa. Interns will be mentored in appropriate areas within the programme.

Public engagement will focus on increasing the visibility of SANSa through video development, public facility tours, and the Space Talk webinar series.

SANSa positioned as a key enabler for the implementation of government's space-related policies Global partnerships with ISES, INTERMAGNET, European Incoherent Scatter Scientific Association (EISCAT), Super Dual Auroral Radar Network (SuperDARN), Committee on Space Research (COSPAR), Scientific Committee on Antarctic Research (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. Building on SANSa's research reputation as a credible expert in Africa for geomagnetic and space weather related sciences, SANSa will position South Africa as a leader in Africa on the near-Earth space environment.

The SANSa African 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 international researchers and students, and through existing partnerships many visitors are hosted each year on specific research projects. The partnership with Germany and the USA through the International Space Weather Camp and the University of Michigan student research programmes will continue. In addition, through the space weather and research projects, SANSa will continue to partner with African and international institutions to grow the knowledge base for the country and the region.

Awareness interventions and activities will be conducted with various sector users within South Africa to encourage the utilisation of SANSa's products and services.

PRIORITIES RELATING TO WOMEN, YOUTH AND PEOPLE WITH DISABILITIES:

The Space Science Programme is contributing towards this priority primarily through the Operational Space Weather Services Project and the Human Capital Development Programme. SANSa has recruited four young women as the first South African Space Weather Forecasters who are undergoing intensive training to be positioned to serve clients within the Space Weather Centre. They are being empowered through employment, the development of scarce skills and knowledge, and exposure to international practices in forecasting techniques. The SANSa space weather team is approximately 80% female and has provided a unique opportunity within this scarce skill field to empower and equip women and the youth.

Over the MTEF, the programme will contribute to the education, supervision and/or mentorship of 80 young students and interns. A target of 50% of this number has been set for women, and SANSa will leverage opportunities for women and the youth to gain skills and exposure to enhance their employment prospects.

1.3.5. PROGRAMME 3: RESOURCE CONSIDERATIONS

Table 16: Space Science Programme – Revenue estimates

Rand	Note	Audited Outcomes			Original Budget 2021/22	Adjustment 2021/22	Revised Budget 2021/22	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21				2022/23	2023/24	2024/25	
REVENUE											
Revenue from Non - Exchange Transactions		37 449 186	46 453 422	53 684 524	78 687 948	23 087 811	101 775 759	70 400 966	60 656 122	61 874 406	192 931 494
Operational Transfers		27 774 293	33 117 037	34 316 841	41 684 378	-	41 684 378	34 901 594	31 994 291	33 430 835	100 326 721
Parliamentary Grant		27 774 293	33 117 037	34 316 841	41 684 378		41 684 378	34 901 594	31 994 291	33 430 835	100 326 721
Ring fenced Grants		9 674 893	13 336 385	19 367 683	37 003 570	23 087 811	60 091 381	35 499 371	28 661 831	28 443 571	92 604 773
Post graduate student bursary support - NRF		784 000	801 000	245 000	407 026	-227 026	180 000	180 000	180 000	180 000	540 000
Post graduate student bursary support - DST		3 075 014	4 034 811	3 776 141	2 700 000	2 700 000	5 400 000	6 500 000	-	-	6 500 000
Research Grants		5 815 879	7 079 497	6 459 012	1 160 695	6 765 110	7 925 805	8 182 785	8 408 125	7 288 556	23 879 466
Space Weather Centre - DST		-	1 421 077	8 887 531	32 735 849	13 849 727	46 585 576	20 636 586	20 073 706	20 975 015	61 685 307
Revenue from Exchange Transactions		10 683 386	10 807 208	9 299 902	9 068 195	27 971 169	37 039 364	9 262 667	9 633 193	10 026 528	28 922 388
Rendering of Services		9 258 368	9 356 961	8 844 150	8 768 195	-22 608	8 745 587	8 925 587	9 281 113	9 658 640	27 865 340
Contract Revenue - Public Sector		7 733 898	7 439 229	7 594 819	7 803 195	52 392	7 855 587	7 935 587	8 247 058	8 578 156	24 760 801
Contract Revenue - Private Sector		511 647	666 314	495 113	465 000	-75 000	390 000	490 000	511 805	534 785	1 536 590
Contract Revenue - Foreign		1 012 823	1 251 418	754 219	500 000		500 000	500 000	522 250	545 699	1 567 949
Other Income		1 425 018	1 450 247	455 751	300 000	-	300 000	337 080	352 080	367 888	1 057 049
Interest Income		537 446	1 004 947	325 087	-	-	-	-	-	-	-
Other Income		792 957	624 352	130 664	300 000		300 000	337 080	352 080	367 888	1 057 049
Net Gains on Foreign exchange transactions		94 615	(179 053)	-	-	-	-	-	-	-	-
Commitments		-	-	-	-	27 993 777	27 993 777	-	-	-	55 987 554
Total Revenue		48 132 571	57 260 630	62 984 425	87 756 143	51 058 980	138 815 123	79 663 633	70 289 315	71 900 934	221 853 882

Table 17: Space Science Programme – Expenditure estimates

Rand	Note	Audited Outcomes			Original Budget 2021/22	Adjustment 2021/22	Revised Budget 2021/22	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21				2022/23	2023/24	2024/25	
Expenditure											
Employee Related Costs - CTC		25 638 717	30 887 769	31 583 500	40 779 039	-2 501 038	38 278 001	44 199 607	46 608 486	49 167 225	139 975 318
Incentive Bonus Provision		-	-	-	2 230 348	-	2 230 348	2 905 113	3 063 441	3 231 624	9 200 178
Depreciation and Amortisation		4 630 168	6 213 382	5 228 485	-	-	-	-	-	-	-
Repairs and Maintenance		1 692 595	1 867 060	2 041 880	7 087 710	-198 099	6 889 611	5 572 544	2 967 126	3 076 317	11 615 987
Finance Costs		105	-	-	-	-	-	-	-	-	-
Data Licence fees		-	-	-	-	-	-	-	-	-	-
Grants and Subsidies Paid		4 556 325	5 320 677	4 632 817	3 180 000	3 001 692	6 181 692	6 680 000	180 000	180 000	7 040 000
Antenna Infrastructure Services		-	-	-	-	-	-	-	-	-	-
Training Expenses		380 705	293 811	395 347	825 000	-34 827	790 173	325 000	340 900	293 512	959 412
General Expenses		7 549 938	9 687 943	6 169 633	17 031 497	5 781 173	22 812 670	11 957 539	14 614 685	14 452 256	41 024 481
Net Losses on Foreign exchange transactions		81 281	-	66 977	-	4 909	4 909	-	-	-	-
Irrecoverable Sundry Debtors		-	50 144	-	-	-	-	-	-	-	-
Loss on Disposal of Property, Plant and Equipment		71 236	182 030	108 805	-	-	-	-	-	-	-
Total Operating Expenditure		44 601 070	54 502 815	50 227 443	71 133 594	6 053 810	77 187 404	71 639 803	67 774 638	70 400 934	209 815 376
Principal/Agent Transfers		-	-	-	-	-	-	-	-	-	-
Surplus / (Deficit) for the year		3 531 501	2 757 814	12 756 982	16 622 549	45 005 170	61 627 718	8 023 829	2 514 677	1 500 000	12 038 506
Capital Expenditure		4 699 889	6 743 370	5 219 072	16 622 549	45 005 170	61 627 718	8 023 829	2 514 677	1 500 000	12 038 506
Buildings and other fixed structures		-	-	1 928 806	-	35 507 210	35 507 210	-	-	-	-
Machinery and equipment		2 710 228	2 880 845	2 611 723	11 985 049	-222 179	11 762 870	4 204 727	1 514 677	1 000 000	6 719 404
Computer Equipment		1 933 983	2 973 271	617 928	3 637 500	9 129 910	12 767 410	3 319 102	1 000 000	500 000	4 819 102
Software and intangible assets		55 678	148 626	60 615	1 000 000	-402 172	597 828	500 000	-	-	500 000
Vehicles		-	740 629	-	-	992 400	992 400	-	-	-	-
Total Expenditure		49 300 959	61 246 185	55 446 515	87 756 143	51 058 980	138 815 123	79 663 633	70 289 315	71 900 934	221 853 882

The expected average income of R74 million for the Space Science Programme is almost R20 million more per year than the previous period, due to the operational income required for the continuation of the Space Weather Project. It should be noted that for the Operational Space Weather Centre to reap the benefits created through the establishment of the capability, a funding injection of at least R20 million per annum is required.

The average employee costs are R49 million over the MTEF period, which is higher than previous financial years. This is mainly due to the additional project-based employees to be recruited, and the fact that the programme is knowledge-intensive, which attracts a higher level of employee. An allocation of 6% of the budget is allocated to repairs and maintenance of the infrastructure. Further

expenditure is included of an average of R2.3 million on grant expenditure, R13.6 million on general expenditure and an average of R4 million for capital expenditure. It should also be noted that the Space Science Programme expenditure includes the expenditure required for maintaining and operating the SANSA Hermanus Facility.

1.4. PROGRAMME 4:



1.4.1. PROGRAMME PURPOSE

The Space Operations (SO) 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 lifecycle 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.

SANSA Space Operations is planning to develop a new ground station at Matjiesfontein. This will ensure that South Africa has the capability to heed the worldwide call from the space sector for deep space capabilities, selected teleport services, as well as the capability to track cubesats from that facility. The facility is also to create the opportunity for the RSA cubesat manufacturers to further develop their programmes in the ground station segment in order to fulfil the total value chain of satellite building.

In contributing towards the SANSA impact of “**A sustainable South African space sector that contributes meaningfully to socio-economic development across the African continent**”, the Space Operations Programme delivers against the following outcome and five-year targets in the approved Strategic Plan:

Outcome 5: Enabling infrastructure developed and upgraded to support the space sector value chain.

Outcome 6: Increased participation of the National Space Programme in the regional and global space market.

The 2022/23 Performance Plan of Programme 4 is reflected in the log frame tables below:

1.4.2. PROGRAMME 4: OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

Table 18: Space Operations Programme – Outcomes, outputs, output indicators and annual targets

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 5 Enabling infrastructure developed and maintained to support the space sector value chain	5.1. Infrastructure developed or upgraded	5.1.4. Percentage progress towards the development of deep space capabilities	-	-	-	Environmental Impact Assessment (EIA) and business case concluded for the development of deep space capabilities	Cost benefit and proposal to government and funders Site establishment 20%	Site establishment 30%	Site establishment 60%
Outcome 6 Increased participation of the National Space Programme in the regional and global space market	6.1. Space products and applications	6.1.1. Number of products and applications	-	-	1	1	1	1	1
	6.2. Revenue generated from Space Operations activities	6.2.1. Rand value of total revenue generated from Space Operations activities	R80 million	R100 million	R75.65 million	R69 million	R70 million	R72 million	R75 million
	6.3. Reputable space operations activities	6.3.1. Successful satellite pass monitoring rate for Earth Observation	99.78%	99.37%	99.35%	98%	98%	98%	98%

1.4.3. PROGRAMME 4: OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

Table 19: Space Operations Programme – Output indicators, annual and quarterly targets

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
5.1.4. Percentage progress towards the development of deep space capabilities	Cost benefit and proposal to government and funders Site establishment 20%	5%	5%	5%	5%
6.1.1. Number of products and applications	1	-	-	-	1 (Space Operations products and applications delivered)
6.2.1. Rand value of total revenue generated from Space Operations activities	R70 million	R17 million	R17 million	R18 million	R18 million
6.3.1. Successful satellite pass monitoring rate for Earth Observation	98%	98%	98%	98%	98%

1.4.4. PROGRAMME 4: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The focus of the programme is:

- 1) Hosted infrastructure services to foreign and local clients.
- 2) Telemetry, tracking and command of satellite platforms.
- 3) Launch support.
- 4) Downloading of Earth observation data during satellite passes.

In so doing, the key priorities are to:

- 1) Create a wider revenue base through locally hosted infrastructure by attracting a larger pool of local and international stakeholders, which ensures more relevance in the global space community.
- 2) Provide assurance of a quality service in line with international standards that helps maintain relevance in the global space industry value chain.
- 3) Ensure that we optimise the return on investment on hosted infrastructure thus promoting the growth and sustainability of SANSa and in addition promoting the retention of high-end skills.

ENHANCE THE COMPETITIVENESS OF THE SOUTH AFRICAN SPACE INDUSTRY

Earth observation Support

A proportion of SANSa's space operations activities with respect to daily passes of Low Earth Orbit (LEO) satellites are devoted to data acquisition for SANSa's Earth Observation Programme. A total of 5 150 satellite passes are forecast for the year for Earth observation with a targeted 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 Space Operations will concentrate on developing its infrastructure in order to enable it to host teleport-like services. This will entail SANSa enhances its sustainability and provide a redundant fibre link to a central hub in South Africa.

Satellite support

SANSa also provides satellite support to various clients on a commercial basis, generating a significant income stream. 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.

Development of deep space capabilities

Space Operations has completed all preliminary work such as site investigation, environmental studies, and site layout on the Matjiesfontein proposed project. The next priorities include conducting a cost benefit study and proposal to various government entities in the 2022-2023 financial year followed by project implementation. The project will have a three-year build time prior to full-scale operations once financial resources have been secured.

PRIORITIES RELATING TO WOMEN, YOUTH AND PEOPLE WITH DISABILITIES:

SANSA SO will continue its process of employing qualified young female professionals into its operational programme, as this is the basis for developing a pool of Space Operations employees for the future. SO will put measures in place to further their career to the extent possible within the technical field and its management as the growth of the organisation excels. In alignment with the transformational agenda of SANSA and government at large, the programme will continue with its efforts towards ensuring people with disabilities benefit from planned interventions.

1.4.5. PROGRAMME 4: RESOURCE CONSIDERATIONS

Table 21: Space Operations Programme – Revenue estimates

Rand	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21	2021/22	2021/22	2021/22	2022/23	2023/24	2024/25	
REVENUE											
Revenue from Non - Exchange Transactions		15 799 573	15 573 291	16 134 677	19 598 656	-	19 598 656	15 026 894	15 056 458	15 732 493	45 815 846
Operational Transfers		15 799 573	15 573 291	16 134 677	19 598 656	-	19 598 656	15 026 894	15 056 458	15 732 493	45 815 846
Parliamentary Grant		15 799 573	15 573 291	16 134 677	19 598 656		19 598 656	15 026 894	15 056 458	15 732 493	45 815 846
AIT facilities/Industry Upgrade/Incentives											-
Operation Phakisa - CPUT											-
Other - Surplus											-
Revenue from Exchange Transactions		67 084 950	84 503 725	63 447 495	58 123 628	50 086 122	108 209 750	59 748 301	63 342 737	66 186 826	189 277 863
Rendering of Services		64 461 263	82 252 830	62 189 849	58 042 958	(7 525 056)	50 517 502	59 662 772	63 252 077	66 092 095	189 006 944
Contract Revenue - Public Sector		5 563 388	5 903 708	6 085 631	5 887 043	442 123	6 329 166	6 076 973	6 441 591	6 730 818	19 249 382
Contract Revenue - Private Sector		9 403 337	4 851 228	4 847 266	5 037 998	(202 028)	4 835 970	5 289 958	5 616 895	5 869 094	16 775 947
Contract Revenue - Foreign		49 494 538	71 497 894	51 256 952	47 117 517	(7 765 151)	39 352 366	48 295 841	51 193 591	53 432 183	152 981 615
Other Income		2 623 687	2 250 895	1 257 645	81 070	-	81 070	85 529	90 660	94 731	270 920
Interest Income		695 696	1 065 887	1 052 536	-	-	-	-	-	-	-
Other Income		280 712	303 002	205 109	81 070	-	81 070	85 529	90 660	94 731	270 920
Impairment Reversal of Accounts Receivable		-	-	-	-	-	-	-	-	-	-
Net gain on Foreign exchange transaction		1 647 279	882 006	-	-	-	-	-	-	-	-
Commitments		-	-	-	-	57 611 178	57 611 178	-	-	-	115 222 356
Total Revenue		82 884 523	100 077 016	79 582 171	77 722 284	50 086 122	127 808 406	74 775 195	78 399 195	81 919 319	235 093 709

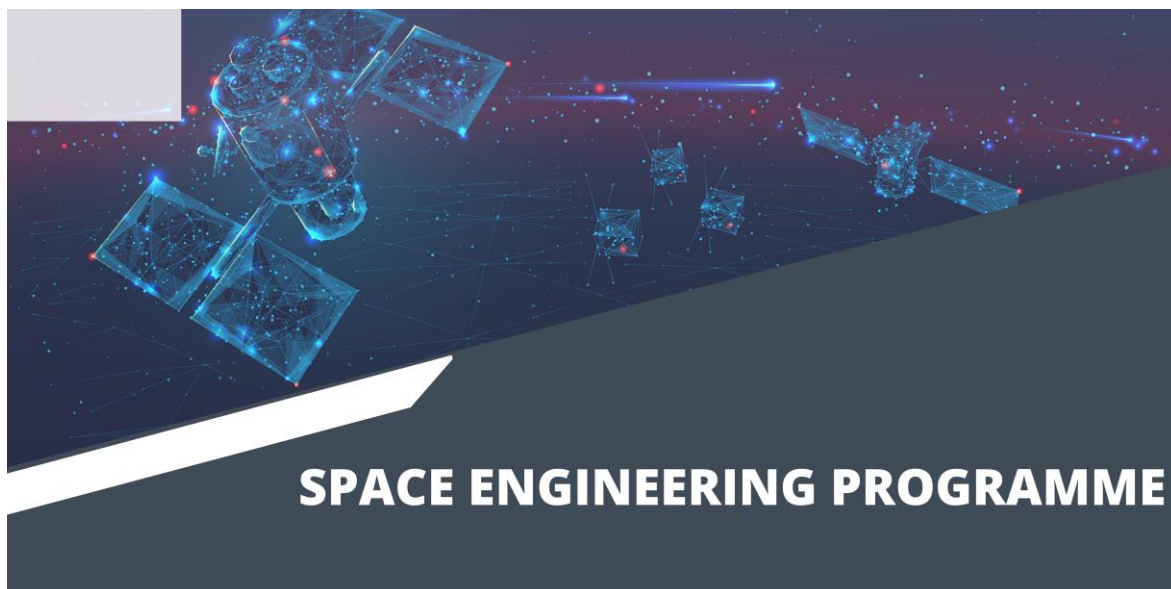
Table 20: Space Operations Programme – Expenditure estimates

Rand	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019/20	2020/21	2021/22	2022/22	2022/22	2022/23	2023/24	2024/25	
Expenditure											
Employee Related Costs - CTC		33 648 936	37 864 522	39 641 008	35 862 460	-	35 862 460	35 990 422	36 124 528	37 746 519	109 861 469
Incentive Bonus Provision		-	-	-	2 988 538	-	2 988 538	2 999 202	3 010 377	3 145 542	9 155 121
Remote Location Allowance		-	-	-	4 582 026	(123 203)	4 458 823	4 801 963	5 032 457	5 258 414	15 092 034
Depreciation and Amortisation		14 133 409	13 367 260	14 505 409	-	-	-	-	-	-	-
Repairs and Maintenance		5 747 905	5 767 560	5 773 416	4 310 941	3 167 838	7 478 779	2 971 397	3 114 024	3 253 844	9 339 265
Antenna Infrastructure Services		2 983 292	6 659 253	4 131 869	-	7 088 970	7 088 970	-	-	-	-
Training Expenses		251 001	387 920	308 460	412 758	100 000	512 758	433 396	455 065	475 497	1 363 958
General Expenses		19 078 907	19 868 403	21 085 402	25 336 350	5 010 113	30 346 464	26 552 495	27 827 009	29 076 436	83 455 940
Net Losses on foreign exchange transactions		-	-	1 382 216	-	-	-	-	-	-	-
Irrecoverable Sundry Debtors		-	4 870 926	-4 854 342	-	-	-	-	-	-	-
Loss on Disposal of Property, Plant and Equipment		670 404	105 882	25 630	-	-	-	-	-	-	-
Total Operating Expenditure		76 513 855	88 891 726	81 999 068	73 493 073	15 243 718	88 736 792	73 748 875	75 563 460	78 956 252	228 268 588
Surplus / (Deficit) for the year		6 370 668	11 185 290	-2 416 897	4 229 211	34 842 404	39 071 614	1 026 319	2 835 735	2 963 067	6 825 121
Capital Expenditure											
Buildings and other fixed structures		-	-	-	-	-	-	-	-	-	-
Machinery and equipment		12 146 542	8 206 788	2 247 821	4 229 211	34 012 079	38 241 289	-	-	1 000 000	1 000 000
Computer Equipment		-	5 624 386	384 522	-	830 325	830 325	1 026 319	2 835 735	1 000 000	4 862 054
Software and intangible assets		-	114 854	80 000	-	-	-	-	-	200 000	200 000
Vehicles		-	-	-	-	-	-	-	-	663 067	663 067
Total Expenditure		88 660 397	102 837 754	84 711 411	77 722 284	50 086 122	127 808 406	74 775 195	78 399 195	81 919 319	235 093 709

The estimated income for the Space Operations Programme over the MTEF period is R78 million, which is lower than usual due to a lower expected income on international revenue. The income also includes an average of R15 million of the parliamentary allocation.

The average employee costs are R44.7 million over the MTEF. The average operational expenses are R76 million over the MTEF period, which includes mainly maintenance of the infrastructure, employee costs and general expenses to support the operations. The average expected capital expenditure is R2 million per year over the MTEF period.

1.5. PROGRAMME 5:



1.5.1. PROGRAMME PURPOSE

The Space Engineering (SE) 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 subsystems 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.

In contributing towards the SANSa impact of “**A sustainable South African space sector that contributes meaningfully to socio-economic development across the African continent**”, the Space Engineering Programme delivers against the following outcome and five-year targets in the approved Strategic Plan:

Outcome 2: Stimulated and growing, inclusive space sector.

Outcome 3: Increased human capacity for the implementation of key space initiatives.

Outcome 4: SANSa positioned as a key enabler for the implementation of government’s space-related policies.

Outcome 5: Enabling infrastructure developed and upgraded to support the space sector value chain.

The 2022/23 Performance Plan of Programme 5 is reflected in the log frame tables below:

1.5.2. PROGRAMME 5: OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

Table 21: Space Engineering Programme – Outcomes, outputs, output indicators and annual targets

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 2 Stimulated and growing, inclusive space sector	2.2. SANSa space-related industry expenditure	2.2.1. The total contract expenditure to the broad space-related industry for core space projects	-	-	R13.68 million	R10 million	R61 million	R67 million	R70 million
Outcome 3 Increased human capacity for the implementation of key space initiatives.	3.2. Students and interns supported	3.2.1. Number of students and interns supported for formalised training	9	7	9	9	16	20	25
Outcome 4 SANSa positioned as a key enabler for the implementation of government's space-related policies	4.3. Joint space programme initiatives undertaken through partnerships	4.3.1. Number of joint initiatives undertaken through formal international partnerships	-	-	1	1	1	1	1
		4.3.2. Number of joint initiatives undertaken through formal African partnerships	-	-	0	1	1	1	1

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
		4.3.3. Number of joint initiatives undertaken through formal National partnerships	-	-	1	1	1	1	1
Outcome 5 Enabling infrastructure developed and upgraded to support the space sector value chain	5.1. Infrastructure developed or upgraded	5.1.5. Percentage progress towards an upgraded AIT Facility	-	-	Project delayed by Covid-19 and Houwteq ownership issues	Revised project schedule and implementation plan	50%	100%	-
Outcome 6 Increased participation of the National Space Programme in the regional and global space market	6.1. Space products and applications	6.1.1. Number of products and applications	-	-	1	1	1	1	1

1.5.3. PROGRAMME 5: OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

Table 22: Space Operations Programme – Output indicators, annual and quarterly targets

OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
		Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
2.2.1. The total contract expenditure to the broad space-related industry for core space projects	R61 million	-	-	-	R61 million
3.2.1. Number of students and interns supported for formalised training	16	16	-	-	-
4.1.2. Number of joint initiatives undertaken through formal international partnerships	1	-	-	-	1
4.1.3. Number of joint initiatives undertaken through formal African partnerships	1	-	-	-	1
4.1.4. Number of joint initiatives undertaken through formal National partnerships	1	-	-	-	1
5.1.5. Percentage progress towards an upgraded AIT Facility	50%	0%	10%	20%	20%
6.1.1. Number of products and applications	1	-	-	-	1 (Space Engineering Services: AIT and CDF)

1.5.4. PROGRAMME 5: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The focus areas of the Programme are:

- 1) Creation of direct jobs in the space industry.
- 2) Mission development and support for microsatellites.
- 3) Mission development and support for nanosatellites.
- 4) The upgrade and maintenance of key infrastructure.

In so doing, the Programme contributes to the outcomes of the approved Strategic Plan as follows:

- 1) Provision of space-based solutions using satellite platforms specifically designed to meet local and regional requirements, but also stimulating the development of the local satellite development industry through the Satellite Build Programme.
- 2) The use of cost-effective satellite platforms for the creation of new knowledge and the development of new and unique solutions for scientific applications and addressing key user requirements, for example, Oceans Phakisa.
- 3) Facilities modernised to international standards that promote industry development and are positioned for use by local, regional, and international users.

Develop national human capacity and ensure transformation

South Africa has the capability to be a leader in Africa to support its space technology requirements. The local market is limited; therefore, these solutions need to meet the broader needs of the African market and beyond. Critical to the development of the local South African space sector would be spinoffs from government programmes to create competitive products and services that can penetrate the African market, through leveraging our current relationships and low-cost high-quality products to meet the international market requirements. In order to ensure the local market grows, SANSA needs to address all the shortcomings within the current Space Programme. Only through effective planning and coordinated implementation of a long-term Space Programme, can substantial growth in the industry be achieved.

Enhance the competitiveness of the South African Space industry

Jobs Supported

An important intervention in ensuring an effective satellite engineering capability within the local space sector, is the critical need for strengthening SANSA's internal space engineering capacity. A formal structure representing the full ambit of capabilities required to effectively oversee and manage the space engineering component of the space value chain needs to be put in place with immediate effect. This intervention must, therefore, ensure that the appropriate systems and processes are in place to support the broader acquisition management, systems engineering, and programme management functions needed for a SANSA Space Engineering Programme. In addition, a plan for training and skills development will need to be implemented to build the requisite expertise required for a satellite engineering programme, especially given that our current cohort of engineers have not been involved in a full mission development experience. This will further

support the growth of the local space industry with effective implementation of the Space Programme.

Satellite Development

In alignment with the National Space Programme (NSP), 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 areas of Earth observation, 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.

The Space Engineering Programme will define missions which, where possible, will include various payloads for different sectors. It is envisaged that systematic approach satellites will be developed to meet the key areas of environmental resources management, health, safety and security, and innovation and economic growth. The Space Programme is also critical for planning and identifying resources skills required by various entities to support government initiatives.

The Concurrent Design/Engineering Facility (CDF/CEF) is being established with the scope to provide a mission design environment for the conceptual design of new space missions applied to pre-phase acquisition assessment studies where concurrent engineering principles are applied. This provides for a more effective organisation of existing mission analysis and design tools with human resources and a generic approach to capture corporate knowledge for further reuse.

The following are the key areas of focus:

- 1) For any new mission, engineering is involved from feasibility through to integration and commissioning.
- 2) Lead the proposal evaluation team to ensure Mission Requirements Document (MRD) and Technical Requirements Specification (TRS).
- 3) Space Engineering Programme provide support with space acquisition, programme management and contract management.
- 4) System Engineering part of Preliminary Design Reviews (PDRs), etc., and Verification and Validation teams' technical compliance.
- 5) System Engineering meeting potential users and compiles user requirements specification (URS).
- 6) Implement the NSP: Engineering can determine the feasibility and requirements for future missions.
- 7) Establish partnerships with African space agencies/partners: Reach out to our ARMC partners for information, knowledge and system engineering experience sharing.
- 8) Build space system engineering communities with African and international partners.

- 9) Establish better contact with potential Level 5 players and System Engineering to start preparing for future missions, such as GEO Comms Geostationary Communications Satellite, Low Earth Orbiting Satellite Aperture Radar (LEO SAR), LEO Defence.
- 10) Mission pre-studies on the above missions at Level 6 at least one to two years before the formal launch of such a project.
- 11) Address what Space Operations and SPD System Engineering does (telecoms and navigation satellites).

Facility development

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 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 build stronger relationships with stakeholders, and be more intuitive to their needs and aspirations. The two core areas of development will be in assembly integration testing, and calibration and validation. Given recent developments in which Denel have opted to exit the space industry, there is a consideration to transfer the Houwteq and Denel Spaceteq capabilities to SANSA. Moreover, space engineering will look at a broader space ecosystem to support the space value chain.

This consideration requires a formal process to be followed in which the justification and long-term sustainability of these capabilities can be motivated for and indeed secured. Should the preconditions for a sustainable satellite engineering programme be confirmed, SANSA will absorb the Houwteq facilities. The Agency will invest in the upgrade and development of new facilities to support space missions for the country and also the local space economy.

- 1) Apart from working with industry and university players, the Space Engineering Programme will manage and maintain the facilities and be engaged in national research and development initiatives.
- 2) Specific areas in Houwteq or any other facility as required by the industry will be earmarked for innovation and incubation activities intended to assist and help develop small and medium enterprises.
- 3) Technology stations will also be established, through potential support of government, to provide access to specialised equipment by the space sector.
- 4) Engineering and technical students will be provided first-hand technical experience by shadowing the experienced SANSA space engineers, as part of their practical experience that is often a requirement for a postgraduate degree and diploma qualification.
- 5) The AIT facility will be opened to non-space users, given the specialised equipment that could be used by industry players residing outside the space sector.
- 6) Access to the AIT facility will be provided to international and African clients, working in partnership with South African experts.

Industry development and support

SANSA's mandate, as prescribed in the SANSA Act (Act No. 36 of 2008), 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. The following approach will be taken:

- 1) Develop consensus amongst all key stakeholders about the prioritisation of needs, opportunities and solutions required to develop a vibrant, globally competitive space industry.
- 2) Provide a mechanism and framework to help the industry forecast technology developments in targeted areas to help strengthen the industry's value proposition.
- 3) Improve the legitimacy and quality of decision-making through the inclusive participation process involved.
- 4) Identify and leverage opportunities for collaborative R&D programmes, thereby improving the chances of success of R&D programmes.
- 5) Provide a visual mapping tool, which can help deconstruct what is a highly complex industry and environment, help to identify and focus on the key issues to be addressed.
- 6) Provide a decision support framework for making technological choices, which are plausible for the country, and which provide the best return of investment (social, economic and environmental).
- 7) Establish base capabilities which support the needs of government, industry, academia and international clients, which is especially important considering the high growth prospects of the sector.
- 8) Identify the common standards, methodologies, and technology platforms establish as well as core capabilities, which ensure a quicker time to market with new systems.

PRIORITIES RELATING TO WOMEN, YOUTH AND PEOPLE WITH DISABILITIES:

Space Engineering will utilise its contracting strategy and industry development plan to encourage the participation of women and people with disabilities on the Space Programme. Moreover, SANSa will be developing a Concurrent Design Facility that will be used to train young engineers on engineering systems. Space Engineering is supporting the DSI on the establishment of science centres to further engage the youth.

1.5.5. PROGRAMME 5: RESOURCE CONSIDERATIONS

Table 23: Space Engineering Programme – Revenue estimates

Rand	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019 /20	2020/21	2021/22	2021/22	2021/22	2022/23	2023/24	2024/25	
Parliamentary Grant		-	5 778 996	7 923 395	17 339 769		17 339 769	7 313 725	7 554 452	7 893 647	22 761 824
Ring fenced Grants		2 561 992	381 472	-	20 910 000	37 741 724	58 651 724	21 684 000	21 766 000	22 743 000	66 193 000
AIT Facilities		-	-	-	-	36 627 448	36 627 448	21 684 000	21 766 000	22 743 000	66 193 000
Concurrent Design Facility		-	-	-	20 910 000	-	20 910 000	-	-	-	-
Satellite Development Programme		2 561 992	381 472	-	-	1 114 277	1 114 277	-	-	-	-
Accumulated surplus roll over					-	2 120 423	2 120 423	-	-	-	4 240 845
Total Revenue		2 561 992	6 160 468	7 923 395	38 249 769	39 862 147	78 111 916	28 997 725	29 320 452	30 636 647	88 954 824

Table 24: Space Engineering Programme – Expenditure estimates

Rand	Note	Audited Outcomes	Audited Outcomes	Audited Outcomes	Original Budget	Adjustment	Revised Budget	Medium Term Expenditure Framework			Total MTEF
		2018/19	2019 /20	2020/21	2021/22	2021/22	2021/22	2022/23	2023/24	2024/25	
Expenditure											
Employee Related Costs - CTC		-	4 484 687	4 567 576	16 006 245	6 200 000	9 806 245	5 738 083	5 738 083	5 995 723	17 471 890
Incentive Bonus Provision		-	-	-	470 435	-	470 435	478 174	478 174	499 644	1 455 991
Depreciation and Amortisation		-	26 855	30 176	-	-	-	-	-	-	-
Grants and Subsidies Paid		-	-	-	141 043	-	141 043	147 813	147 813	154 449	450 074
Training Expenses		-	-	-	-	1 500 000	1 500 000	-	-	-	-
General Expenses		-	381 472	37 931	722 047	-	722 047	949 656	949 656	992 295	2 891 606
Total Operating Expenditure		-	4 893 014	4 635 683	17 339 769	4 700 000	12 639 769	7 313 725	7 313 725	7 642 111	22 269 561
Capital Expenditure		2 557 984	-	-	20 910 000	44 562 147	65 472 147	21 684 000	22 006 727	22 994 536	66 685 263
Buildings and other fixed structures		-	-	-	-	500 000	500 000	-	-	-	-
Machinery and equipment		-	-	-	-	250 000	250 000	-	-	-	-
Computer Equipment		-	-	-	-	1 950 000	1 950 000	-	240 727	251 536	492 263
Software and intangible assets		-	-	-	-	2 000 000	2 000 000	-	-	-	-
Vehicles		-	-	-	-	-	-	-	-	-	-
AIT Facility		-	-	-	-	59 657 870	59 657 870	21 684 000	21 766 000	22 743 000	66 193 000
Concurrent Design Facility*		-	-	-	20 910 000	20 910 000	-	-	-	-	-
ARMC Nanosatellite constellation		-	-	-	-	-	-	-	-	-	-
Satellite Development Programme		2 557 984	-	-	-	1 114 277	1 114 277	-	-	-	-
Total Expenditure		2 557 984	4 893 014	4 635 683	38 249 769	39 862 147	78 111 916	28 997 725	29 320 452	30 636 647	88 954 824

The expected average income of R22 million for the Space Engineering Programme that includes an average of R7.5 million of the Parliamentary Grant allocation and the balance from the ring-fenced grant. The average employee costs are R6.3 million over the MTEF. This is mainly due to the additional project-based employees to be recruited. The average operational expenses are R7.4 million over the MTEF period and the average capital expenditure is R14.6 million per year over the MTEF period.

In overseeing the Space Engineering Programme, it is critical to have a national focus that aims to strengthen the space value chain. SANSa now has the opportunity through the SIH to meet the broader requirements of government, industry and academia. Thus, careful consideration needs to be given to the operating model that will ensure development and growth of the local space industry.

To achieve this, it is envisaged Space Engineering Programme will provide a structured approach to enable the growth of the space industry through enhancing competition, collaboration and partnerships. Engineering resources are critical to ensure successful development of space missions. The resourcing will be done in several phases.

- 1) **Phase 1** will stabilise the current environment to ensure that an absolute minimum skillset is appointed for the continuity of the engineering function. These are all direct reports to the ED, which will form the management team for Space Engineering. During Phase 1 the management team will now start to formulate the final job specification for Phase 2.
- 2) **Phase 2** is to adequately resource Space Engineering to develop the full capability for acquisition management. It will be the responsibility of the core management team to manage and implement the full operational plan for its individual functional areas. This requirement is for a full complement of engineers working within Space Engineering to provide full support on Space Mission Acquisition. Some changes may be made to the structure in Phase 2 for operational reasons.
- 3) **Phase 3** will be based on the knowledge that is acquired during the implementation of the engineering function. It is assumed that some refinement will be required to optimise the engineering capability during this phase.

Note: as at the time of planning SANSa does not have the budget to capacitate Space Engineering. The budget allocation above is limited to Phase 1 only.

2. CONSOLIDATED OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND ANNUAL TARGETS

Table 25: 2022/23 Consolidated Outcomes, Outputs, Output Indicators and Annual Targets

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 1 Increased space relevant knowledge that supports the developmental agenda	1.1. National research and development output in space-related sciences	1.1.1. National research productivity score for supported R&D	1 835	1 765	1 904.44	1 300	1 445	1 715	1 800
Outcome 2 Stimulated and growing, inclusive space sector	2.2. SANSa space-related industry expenditure	2.2.1. The total contract expenditure to the broad space-related industry for core space projects	-	-	R13.68 million	R10 million	R61 million	R67 million	R70 million
Outcome 3 Increased human capacity for the implementation of key space initiatives	3.1. Youth awareness of space-related sciences	3.1.1. Number of youth directly engaged on space-related sciences	24 337	36 506	2 937	21 125	37 250	42 500	48 000
	3.2. Students and interns supported	3.2.1. Number of students and interns supported for formalised training	52	54	60	50	72	92	105
Outcome 4:	4.3. Joint space	4.3.1. Number of joint initiatives	-	-	-	11	9	9	12

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
SANSa positioned as a key enabler for the implementation of government's space-related policies	programme initiatives undertaken through partnerships	undertaken through formal international partnerships							
		4.3.2. Number of joint initiatives undertaken through formal African partnerships	-	-	-	9	10	11	14
		4.3.3. Number of joint initiatives undertaken through formal National partnerships	-	-	-	12	13	14	18
	4.4. Awareness and training to key users of space-related products and services	4.4.1. Number of awareness and training interventions to key users of space-related products and services	-	-	9	5	8	8	12
	4.5. Government departments and public entities using space products and services	4.5.1. Number of additional government departments and public entities that are using space products and services	-	-	-	Indicator reframed	10	10	10

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Outcome 5 Enabling infrastructure developed and maintained to support the space sector value chain	5.1. Infrastructure developed or upgraded	5.1.1. Development of Digital Earth South Africa	-	-	Ingestion of SPOT archive	Ingestion of Landsat archive	An operational Digital Earth South Africa	An operational Digital Earth South Africa	An operational Digital Earth South Africa
		5.1.2. Development of the Space Infrastructure Hub (SIH)	-	-	-	Conclusion of a feasibility study for a bankable project	Initiate acquisition of the Phase-1 mission system	Conclude acquisition of the Phase-1 mission system	Launch and in-orbit testing of Phase-1 satellites (including development of downstream applications)
		5.1.3. Percentage progress towards a new operational space weather centre, as per an approved Business Case	-	-	42.8%	70%	100%	Operational Space Weather Centre maintained at 75%	Maintain Operational Space Weather Centre maintained at 90%
		5.1.4. Percentage progress towards the development of deep space capabilities	-	-	-	Environmental Impact Assessment (EIA) and Business case concluded for the development of deep space capabilities	Cost benefit and proposal to government and funders Site establishment 20%	Site establishment 30%	Site establishment 60%
Outcome 5 Enabling infrastructure developed and maintained to	5.1. Infrastructure developed or upgraded	5.1.5. Percentage progress towards an upgraded AIT Facility	-	-	Project delayed by Covid-19 and Houwteq ownership issues	Revised project schedule and implementation plan	50%	100%	-

OUTCOME	OUTPUTS	OUTPUT INDICATORS	AUDITED PERFORMANCE			ESTIMATED PERFORMANCE	MTEF TARGETS		
			2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
support the space sector value chain									
Outcome 6 Increased participation of the national space programme in the regional and global space market	6.1. Space products and applications	6.1.1. Number of products and applications	-	-	7	6	7	7	7
Outcome 6 Increased share of the National Space Programme in the regional and global space market	6.2. Revenue generated from space operations activities	6.2.1. Rand value of total revenue generated from space operations activities	R80 million	R100 million	R75.65 million	R69 million	R70 million	R72 million	R75 million
	6.3. Reputable space operations activities	6.3.1. Successful satellite pass monitoring rate for Earth Observation	99.78%	99.37%	99.35%	98%	98%	98%	98%

3. UPDATED KEY RISKS

The strategic risks reflected in the 2020-2025 Strategic Plan are updated as follows:

Table 26: Updated risks and mitigation actions

OUTCOMES	RISK DESCRIPTION	MITIGATION ACTIONS
Outcome 1	Significant decline in the generation and dissemination of new knowledge.	<ul style="list-style-type: none"> ▪ Engage DHET to develop mechanisms for incentivising SANSa-based researchers. ▪ Partnering with Research Institution and Institution of Higher Learning to develop and maintaining a viable pipeline of researchers.
Outcome 2	Disintegrated approach to industry development by the various role-players.	<ul style="list-style-type: none"> ▪ Clearer marketing and promotional initiatives emphasising SANSa’s role in driving external national capability development. ▪ Internal workshopping on building internal and external facing SANSa narratives. ▪ Subsequent Communications Strategy and external workshopping around SANSa narratives. ▪ Strengthen relationships with industry and national stakeholders. ▪ SIH implementation.
Outcome 3	Reduced ability to create awareness amongst the youth to maintain and/or grow a developmental pipeline.	<ul style="list-style-type: none"> ▪ Align science engagement activities to contribute to the District Development Model.
	Inability to absorb new and innovative skills generated through a “pipeline”.	<ul style="list-style-type: none"> ▪ Review the Space Industry Development Framework (to include the development of entrepreneur/business incubation).
Outcome 4 and Outcome 6	Drastic reduction in the use of space-based products and services.	<ul style="list-style-type: none"> ▪ Develop and drive marketing collateral for products and services. ▪ Capitalisation of infrastructure. ▪ Engage DSI and NT in changing the scheduling of SANSa – or retain and invest. ▪ Formal annual request to NT to retain surplus. ▪ Effective roll-out of knowledge management.

OUTCOMES	RISK DESCRIPTION	MITIGATION ACTIONS
Outcome 5	Limited competitiveness and ability to access new markets.	<ul style="list-style-type: none">▪ Mobilisation of additional resources (capitalisation)▪ Formal annual request to NT to retain surplus

4. PUBLIC ENTITIES

Not applicable.

5. INFRASTRUCTURE PROJECTS

Table 29: SANSa planned infrastructure projects for 2022/23

Nº.	PROJECT NAME	PROGRAMME	DESCRIPTION	OUTPUTS	START DATE	COMPLETION DATE	TOTAL ESTIMATED COST	CURRENT YEAR EXPENDITURE
1	Space Weather Services Project	Space Science	The building and equipping of a 24/7 operational space weather centre	A new Space Weather Centre building	1 April 2021	30 September 2022	R 20 million	R 8.8 million
2	Guest House accommodation	Space Science	The increase in accommodation on the Hermanus site	A new 4-bedroom guesthouse on the Hermanus campus	1 April 2021	30 October 2022	R4.8 million	R 0
3	Extension to Student Accommodation	Space Science	The building of a new wing on the existing student accommodation block	Increased capacity for student development	1 January 2022	31 December 2022	R 5 million	R 5 million
4	New 3.7 Antenna for Earth Observation Data	Space Operations	S&X band antenna	EO data for SA	1 October 2021	30 June 2022	R10 million	-
5	AIT Facility	Space Engineering	Development and upgrade of AIT facility	Infrastructure for the Industry	1 April 2021	31 March 2023	R72 million	R35 million
6	CDF Facility	Space Engineering	Development of a Concurrent Design Facility	Infrastructure for the Industry and the agency for mission planning	1 April 2020	31 March 2023	R18.16 million	R10.45 million

6. PUBLIC PRIVATE PARTNERSHIPS

Not applicable.

PART D: TECHNICAL INDICATOR DESCRIPTIONS

Indicator Title 1.1.1.	The national research productivity score for supported R&D
Definition	The research productivity score for R&D. This is meant to demonstrate SANSa’s research output and is an indicator of research output, quality, impact, and relevance.
Source of data	<p>This productivity score is based on a function of research funding sourced + publications (journals, books, reports, proceedings) + students graduated + research rating status.</p> <p>Data sources to include:</p> <ul style="list-style-type: none"> (i) Published papers in pdf and hard copy available. For books - front pages available in pdf. Impact Factor as per the quarter end date determined from publisher’s web page (screen shot to be retained). (ii) Proceedings or popular articles in pdf available. (iii) Grant funding listed for the calendar year in grant award registers, and award letters available – also available from finance system as grant income received, copy of register from NRF 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 engagement funding. (iv) Students graduated – list is maintained with pdf copies of degree certificates or award letters or university confirmation letters. (v) Research rating status – determined by rating award letters.
Method of Calculation / Assessment	Composite function as described in “Determination of Research Productivity Score” document.
Means of verification	<ul style="list-style-type: none"> ▪ Count the hard copies of publications, proceedings, and books. ▪ Verify that evidence exists for all aspects included in the formula. ▪ Verify Excel sheet with calculation.
Assumptions	Availability of required data on key inputs to be scored and reported.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative.
Reporting Cycle	Quarterly

Desired Performance	A national research productivity score of 1 445 achieved.
Indicator Responsibility	MD: Space Science / MD: Earth Observation

Indicator Title 2.1.1.	Percentage operational expenditure spend on SMEs
Definition	<p>This measures the extent to which SANSa is supporting SMEs through all operational procurement expenditure, as overseen by SCM for the organisation.</p> <p>The indicator measures the percentage of all operational expenditure that is outsourced to small to medium enterprises (SMEs) for all SANSa programmes, including Administration/Corporate Office, Earth Observation, Space Science, Space Operations and Space Engineering programmes. This should not include consultancy expenditure for general support initiatives. Data license fees will also be an exception and are not to be considered in calculation of the SME contract values. Key considerations will be supplier turnover of no more than R50 million and employees not exceeding 250.</p>
Source of data	Internal contracts/purchase orders and related invoices for related expenditure.
Method of Calculation / Assessment	Rand value of invoices relating to SANSa operational expenditure divided by the rand value of those invoices outsourced to SMEs.
Means of verification	Invoices and SCM reports reflecting supplier expenditure on outsourced services.
Assumptions	Availability of SANSa funds to be expended on programmes under its control.
Disaggregation of Beneficiaries	<p>While this may not be possible to achieve in the next financial year, SANSa will strive towards achieving the MTSF 2019-2024 targets for designated groups:</p> <ul style="list-style-type: none"> ▪ Women-owned SMEs – 40% ▪ Youth-owned SMEs – 30% ▪ PWD-owned SME – 7%
Spatial Transformation	Not applicable.
Calculation Type	Cumulative (year-end)
Reporting Cycle	Quarterly
Desired Performance	30% or more procurement spend on SMEs
Indicator Responsibility	Chief Financial Officer supported by: ED: Enterprise Services, MD: Earth Observation / ED: Space Engineering and MD: Space Science.

Indicator Title 2.2.1.	The total contract expenditure to the broad space-related industry for core space projects
Definition	The indicator measures the contract value that is outsourced to small to medium enterprises (SMEs) and big industry players . (This should not include consultancy expenditure for general support initiatives).
Source of data	Internal contracts and invoices and where available auditable reports from affected companies.
Method of Calculation / Assessment	This would be the rand value total of all the contractual expenditure to the broad space-related industry for core space projects.
Means of verification	Invoices: The Contracts Manager will compare his figures against those held by Finance before releasing his numbers to the quarterly report.
Assumptions	Availability of SANSa funds to be expended on programmes under its control.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative.
Reporting Cycle	Annually
Desired Performance	R61 million total contract expenditure to the broad space-related industry for core space projects.
Indicator Responsibility	ED: Space Engineering

Indicator Title 3.1.1.	Number of youth directly engaged on space-related sciences
Definition	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, Mobile Lab activity) and will exclude a count of young people who visit SANSa stands at exhibits.
Source of data	<ul style="list-style-type: none"> ▪ Hard copies of attendance register of activities. ▪ Pdf of attendance registers and summary. ▪ Other relevant reports or written confirmations to be utilised where virtual sessions were held.

Method of Calculation / Assessment	Manual calculation of the quantitative number of youth beneficiaries. Youth beneficiaries refer to all individuals engaged by SANSA that are aged from 6 years to 36 years.
Means of verification	<ul style="list-style-type: none"> ▪ Signed-off attendance registers – sign off by educator or SANSA representative acceptable. ▪ Other relevant reports or written confirmations to be utilised where virtual sessions were held.
Assumptions	Participation of targeted beneficiaries.
Disaggregation of Beneficiaries	Target for youth.
Spatial Transformation	Activities will cover all Districts identified in the District Development Model.
Calculation Type	Cumulative (year-end)
Reporting Cycle	Quarterly
Desired Performance	37 250 youth directly engaged by SANSA.
Indicator Responsibility	MD: Space Science / Earth Observation

Indicator Title 3.2.1.	Number of students and interns supported for formalised training
Definition	<p>The total number of students currently linked and supported by SANSA through bursaries and/or supervised by SANSA researchers. SANSA employees who are supported under any SANSA staff development scheme should not be counted.</p> <p>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. Interns that are employed through any mechanism and mentored by a SANSA employee are counted.</p>
Source of data	<ul style="list-style-type: none"> ▪ Contracts and student agreements and student records. ▪ Proof of supervision engagement. ▪ Internship contracts or other SANSA agreement.
Method of Calculation / Assessment	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. That is, students have to be counted once per financial annum in the quarter in which they joined or began to be supported by SANSA. To simplify students and interns will not be counted in quarter 4, however, all supported students and interns will be counted in quarter 1 (April) for the new financial and academic year.

Means of verification	Contracts and student agreements, proof of student supervision contracts/register are available.
Assumptions	Participation of targeted beneficiaries.
Disaggregation of Beneficiaries	Beneficiaries may include youth, women, and persons with disability as appropriate.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative
Reporting Cycle	Annually
Desired Performance	72 students and interns supported for formalised training.
Indicator Responsibility	MD: Space Science / MD: Earth Observation / ED: Space Engineering

Indicator Title 4.1.1.	Number of initiatives to transform SANSa into a high-performing Agency
Definition	This indicator provides for the interventions needed to improve the performance of SANSa.
Source of data	The EXCO approved Change Management Process, and Online Performance Management System initiatives concluded as per the respective work/project plans.
Method of Calculation / Assessment	Submission of EXCO approved change management process, and performance management system work/project plans and reports on progress thereof.
Means of verification	Interventions presented to and approved by EXCO.
Assumptions	Availability of internal capacity.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative.
Reporting Cycle	Bi-annually.
Desired Performance	2 initiatives towards a high-performance agency completed.
Indicator Responsibility	ED: Enterprise Services

Indicator Title 4.2.1.	Percentage implementation of the Audit Action Plan
Definition	This indicator monitors the implementation of external and internal audit recommendations that business units can complete within the financial year.
Source of data	Information provided by the responsible business units, consolidated into the updated Audit Action Plan.
Method of Calculation / Assessment	Number of audit recommendations completed as a percentage of the total number of audit recommendations planned for completion within the financial year
Means of verification	Quarterly updated Audit Action Plan, presented to EXCO
Assumptions	<ul style="list-style-type: none"> ▪ Availability of internal capacity and financial resources. ▪ Measured against audit findings that can be completed within the same financial year.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Cumulative (year to date)
Reporting Cycle	Quarterly
Desired Performance	Equal to or greater than 95% implementation of planned audit recommendations
Indicator Responsibility	Chief Financial Officer supported by All Executives

Indicator Title 4.3.1	Number of joint initiatives undertaken through formal international partnerships
Definition	This indicator establishes the number of active projects/activities with existing international partners or the establishment of projects through new international partnerships. In the case of SANSa, partnerships include any associations, collaborations and/ or mutual agreements wherein the Agency works with external stakeholders to achieve a common goal.
Source of data	Tracking of active projects implemented with existing partners or new projects with new partners or where new activity has occurred.
Method of Calculation / Assessment	Each active project will be recorded together with the activities engaged in per quarter. A partner will only be counted once per financial year irrespective of the number of activities undertaken.

Means of verification	Partnership reports are signed off on a quarterly basis.
Assumptions	Stakeholder engagement and collaboration.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Cumulative
Reporting Cycle	Tri-Annually.
Desired Performance	8 activities/projects through formal international partnerships.
Indicator Responsibility	MD: Earth Observation / MD: Space Science / ED: Space Engineering

Indicator Title 4.3.2	Number of joint initiatives undertaken through formal African partnerships
Definition	This indicator establishes the number of active projects/activities with existing African partners or the establishment of projects through new African partnerships. In the case of SANSa, partnerships include any associations, collaborations and/or mutual agreements wherein the Agency works with external stakeholders to achieve a common goal.
Source of data	Tracking of active projects implemented with existing partners or new projects with new partners or where new activity has occurred.
Method of Calculation / Assessment	Each new project title will be recorded together with the new activities engaged in per quarter.
Means of verification	Partnership reports are signed off on a quarterly basis.
Assumptions	Stakeholder engagement and collaboration.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Cumulative
Reporting Cycle	Tri-annually.
Desired Performance	10 activities/projects through formal African partnerships.
Indicator Responsibility	MD: Earth Observation / MD: Space Science / ED: Space Engineering

Indicator Title 4.3.3	Number of joint initiatives undertaken through formal National partnerships
Definition	This indicator establishes the number of active projects/activities with existing African partners or the establishment of projects through new African partnerships. In the case of SANSa, partnerships include any associations, collaborations and/or mutual agreements wherein the Agency works with external stakeholders to achieve a common goal.
Source of data	Tracking of active projects implemented with existing partners or new projects with new partners or where new activity has occurred.
Method of Calculation / Assessment	Each new project title will be recorded together with the new activities engaged in per quarter.
Means of verification	Partnership reports are signed off on a quarterly basis.
Assumptions	Stakeholder engagement and collaboration.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Cumulative (year-end)
Reporting Cycle	Tri-annually.
Desired Performance	12 activities/projects through formal National partnerships.
Indicator Responsibility	MD: Earth Observation / MD: Space Science / ED: Space Engineering

Indicator Title 4.4.1.	Number of awareness and training interventions to key users of space-related products and services
Definition	The indicator is designed to measure the marketing of space products and services to key users.
Source of data	Tracking of awareness and training interventions, including the users reached.
Method of Calculation / Assessment	A spreadsheet and/or registers will be maintained indicating the users reached, the awareness or training interventions undertaken, and the related products and services. Attendance registers will be kept as a record. Where applicable, written confirmation of remote/virtual training sessions.
Means of verification	Reports and other records are signed off on a quarterly basis.
Assumptions	Participation of targeted beneficiaries.

Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable
Calculation Type	Cumulative (year-end)
Reporting Cycle	Quarterly
Desired Performance	8 awareness and training interventions.
Indicator Responsibility	MD: Earth Observation / MD: Space Science

Indicator Title 4.5.1	Number of additional government departments and public entities that are using space products and services
Definition	The measurement of the usage of space data and value-added products by government (all three spheres) and its entities.
Source of data	<p>Reports that document provision of data and value-add products to additional government departments and entities, including appropriate statistics. This information may include some or all of the following:</p> <ul style="list-style-type: none"> ▪ Stakeholder registry. ▪ Data and product distribution statistics. ▪ Online access of data and products. ▪ Industry contracts/agreement to deliver services/products. ▪ Confirmed orders for services/products; and ▪ Reports on use and impact.
Method of Calculation / Assessment	A brief qualitative report of the additional number of organs of State that use using services/products that have been delivered to which government stakeholders will be used as the products/services are not a simple statistical/numerical activity. The report will also contain how the impactful product/service was determined for this indicator.
Means of verification	Sample testing some of the assertions in the organs of state using Space Products/Service Report against some of the validation material, e.g., data transmission logs, client acceptance signatures, contract registers, progress reports.
Assumptions	Availability of baseline information and space products and services that meet client needs.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Across South Africa.

Calculation Type	Cumulative (year-end)
Reporting Cycle	Quarterly
Desired Performance	10
Indicator Responsibility	MD: Earth Observation

Indicator Title 5.1.1.	Development of Digital Earth South Africa
Definition	Provision of progress towards the development of an operational data cube platform, namely, Digital Earth South Africa.
Source of data	Quarterly reports prepared on the project progress against the project concept document.
Method of Calculation / Assessment	Tracking of progress (in percentage) against the project action plan.
Means of verification	Comparison of the current project schedule against original project action plan.
Assumptions	Sampling of use cases to be provided.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative.
Reporting Cycle	Annually
Desired Performance	Ingestion of additional (1) sensor
Indicator Responsibility	MD: Earth Observation.

Indicator Title 5.1.2.	Development of the Space Infrastructure Hub (SIH)
Definition	This indicator shows progress towards achieving the milestones of the SIH project.
Source of data	Quarterly reports are prepared on the project progress against the approved project plan. Tracking of progress against key milestones.

Method of Calculation / Assessment	Compare the project progress with the milestones of the project plan.
Means of verification	Comparison of actual progress against the approved project plan and schedule.
Assumptions	Project schedule and milestones not affected by external factors that limits the accuracy. Existence of project implementation capacity and adequate funding.
Disaggregation of Beneficiaries	Local industry support to yield upstream benefits in terms of economic stimulation and downstream benefits to be realised once the system is operational.
Spatial Transformation	National
Calculation Type	Non-cumulative.
Reporting Cycle	Quarterly
Desired Performance	Initiate acquisition of the Phase-1 mission system
Indicator Responsibility	MD: Earth Observation / MD: Space Science / ED: Space Engineering / MD: Space Operations

Indicator Title 5.1.3.	Percentage progress towards a new operational space weather centre, as per an approved Business Case
Definition	This indicator shows progress towards achieving the aim of a 24/7 operational space weather centre.
Source of data	Quarterly reports are prepared on the project progress against the approved business case. Tracking of progress against key milestones.
Method of Calculation / Assessment	Compare the project progress with the project action plan and calculate a percentage based on the estimate progress towards the final goal.
Means of verification	Comparison of latest project schedule against the original project schedule and approved business case.
Assumptions	Project schedule and milestones not affected by external factors that limits the accuracy. Existence of project implementation capacity.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Overberg District Municipality; Town of Hermanus
Calculation Type	Non-cumulative.

Reporting Cycle	Annually
Desired Performance	100% completion.
Indicator Responsibility	MD: Space Science.

Indicator Title 5.1.4.	Percentage progress towards the development of deep space capabilities
Definition	Progress against the project plan for the development of deep space capabilities.
Source of data	Quarterly reports prepared on the project progress against the project concept document.
Method of Calculation / Assessment	Tracking of progress (in percentage) against the project action plan.
Means of verification	Comparison of the current project schedule against original project action plan.
Assumptions	Availability of requisite funding from government.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Cumulative.
Reporting Cycle	Quarterly
Desired Performance	<ul style="list-style-type: none"> ▪ Cost benefit and proposal to government and funders concluded. ▪ Site establishment 20%.
Indicator Responsibility	MD: Space Operations

Indicator Title 5.1.5.	Percentage progress towards an upgraded AIT Facility
Definition	The AIT facility upgrade is to support the space industry. The current facility will undergo various areas of improvement to support the development of satellites.
Source of data	As per project plan on the upgrade of the AIT Facility.

Method of Calculation / Assessment	Progress report on completion of Houwteq ownership processes by Quarter 2. A Board approved revised project schedule and implementation plan by end of the Quarter 3.
Means of verification	Comparison of latest project progress against the project schedule and approved business case.
Assumptions	Availability of capacity. Project schedule and milestones not affected by external factors that limit the accuracy.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative.
Reporting Cycle	Tri-annually.
Desired Performance	50% progress towards an upgraded AIT Facility
Indicator Responsibility	ED: Space Engineering.

Indicator Title 6.1.1	Number of products and applications
Definition	The number of products/services (PS) delivered within any one of the following PS areas, (i) PS1-Data as a Service, (ii) PS2 – Remote Sensing Products, (iii) PS3 – Infrastructure as a Service, (iv) PS4 - Magnetic Technology Services, (v) PS5 – Space Weather Services, and (vi) PS6 - Space Operation Products and Applications.
Source 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>PS1 – Data as a Service</p> <ul style="list-style-type: none"> ▪ Data collected (sensor portfolio). ▪ Contracts and active agreements on data access. ▪ Data distributed, including online data access. ▪ Data request and distribution statistics; and ▪ Report on use and impact. <p>PS2 – Remote Sensing Products</p> <ul style="list-style-type: none"> ▪ Confirmed orders for services/products. ▪ Frequency of production or publication of base remote sensing and fundamental data products. ▪ Industry contracts/agreement to deliver services/product; and ▪ Report on use and impact.

	<p>PS3 – Infrastructure (Platforms) as a Service</p> <ul style="list-style-type: none"> ▪ Use cases built on Digital Earth South Africa. ▪ Confirmed orders for services/products; and ▪ Report on use and impact. <p>PS4 – Magnetic Technology Services</p> <ul style="list-style-type: none"> ▪ Calibration services sheets; and ▪ Report on uptake, use and impact. <p>PS5 - Space Weather Services</p> <ul style="list-style-type: none"> ▪ Client progress reports, if applicable; and ▪ Report detailing uptake, use and impact. <p>PS6 - Space Operation Products and Applications</p> <ul style="list-style-type: none"> ▪ Progress reports on products/services to clients in the local and global space community; and ▪ Report on use and impact. <p>PS7 – Space Engineering Services (AIT and CDF)</p> <ul style="list-style-type: none"> ▪ Progress reports on products/services to clients. ▪ Report on use and impact.
Method of Calculation / Assessment	A brief qualitative report of the services/products that have been delivered will be used as the products/services are not a simple statistical/numerical activity. The report will also contain how the impactful product/service was determined for this indicator.
Means of verification	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.
Assumptions	Meaningful activities that can be validated.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative
Reporting Cycle	Annually
Desired Performance	7 products/applications developed.
Indicator Responsibility	MD: Earth Observation / MD: Space Science / MD: Space Operations / ED: Space Programme.

Indicator Title 6.2.1.	Rand value of total revenue generated from space operations activities
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Definition	This measures the revenue generation capacity of the Space Operations activities. The income generated by the Space Operations Programme for the financial year, includes all forms of income, e.g., intercompany contractual revenue, external contracts, ring-fenced grant income.
Source of data	This information is based on signed contracts and the actual financial transactions on the financial system and reported numbers on the financial statements.
Method of Calculation / Assessment	This would be the total rand value of all the contractual revenue generated under the space operations programme.
Means of verification	Contracts with the clients and invoices.
Assumptions	Stakeholder engagement and collaboration.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Cumulative (year-end).
Reporting Cycle	Quarterly
Desired Performance	A total income of R70 million generated by year-end.
Indicator Responsibility	MD: Space Operations

Indicator Title 6.3.1.	Successful satellite pass monitoring rate for Earth Observation
Definition	The measurement of the rate of success in downloading SANSa EO data measured in proportional time achieved. To measure the success rate of SANSa in supporting Earth Observation data acquisition. It also shows the impact of SANSa's space operations activities to EO.
Source of data	<ul style="list-style-type: none"> ▪ Data acquired is calculated minutes of a pass or a fraction thereof. ▪ Data losses are calculated in minutes or fractions thereof. ▪ Operational workload is calculated in passes per day.
Method of Calculation / Assessment	Systematic count of minutes of data captured and demodulated (in percentage format).
Means of verification	SO verifies with EO on quantity (minutes) and quality of data acquired.

Assumptions	Availability of required data.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.
Calculation Type	Non-cumulative.
Reporting Cycle	Quarterly.
Desired Performance	98% Satellite Pass Monitoring Rate achieved.
Indicator Responsibility	MD: Space Operations

ANNEXURES TO THE ANNUAL PERFORMANCE PLAN

ANNEXURE A: AMENDMENTS TO THE STRATEGIC PLAN

Refer to Revised 2020-2025 Strategic Plan (2022/23 Revision).

ANNEXURE B: CONDITIONAL GRANTS

Not applicable.

ANNEXURE C: CONSOLIDATED INDICATORS

Not applicable.

ANNEXURE D: DISTRICT DEVELOPMENT MODEL

AREAS OF INTERVENTION	FIVE-YEAR PLANNING PERIOD				
	Project description	District Municipality	Location: GPS coordinated	Project leader	Social partners
Spatial development	High and medium resolution satellite imagery supporting decision-making	Various districts and metros	Various throughout country	Imraan Saloojee	Not applicable
	National Water Quantity Information System	Various districts and metros	Various throughout country	Imraan Saloojee	Department of Water and Sanitation
	Disaster awareness	Various districts and metros	Various throughout country	Stewart Bernard	National Disaster Management Centre
	Flood risk	Various districts and metros	Various throughout country	Stewart Bernard	National Disaster Management Centre
	Human Settlements	Various districts and metros	Various throughout country	Stewart Bernard	Dept. of Human Settlements; Housing Development Agency
Ecological and Biodiversity	High and medium resolution satellite imagery	Various districts and metros	Various throughout country	Imraan Saloojee	High and medium resolution satellite imagery

AREAS OF INTERVENTION	FIVE-YEAR PLANNING PERIOD				
	Project description	District Municipality	Location: GPS coordinated	Project leader	Social partners
	supporting decision-making				supporting decision-making
	National Water Quantity Information System	Various districts and metros	Various throughout country	Imraan Saloojee	National Water Quantity Information System
Social Development	Science outreach projects	Various throughout country	Various throughout country	Thandile Vuntu and Dan Matsapola	Various rural schools and education NGOs
	Municipal training	Ngaka Modiri Molema District Waterberg District Ehlanzeni District	Tswaing Local Municipality Mbombela is the local municipality	Dan Matsapola	Ngaka Modiri Molema District Waterberg District Ehlanzeni District
Economic and Infrastructure	Space Weather Centre	Overberg District Municipality	-34.42413 19.22485	Keenan Janneker	Not applicable
	High resolution satellite imagery supporting infrastructure monitoring	Various districts and metros	Various throughout country	Imraan Saloojee	PICC
	3,7m antenna for Earth Observation Data	Mogale City	25,53,14.66s 27.42.28,59e	Raoul Hodges	Not applicable
Safety and Security	Magnetically Clean Environment supporting magnetic technology products and services for the defence and space sectors	Overberg District Municipality	-34.42413 19.22485	Danie Gouws	Not applicable