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Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

sansa
SOUTH AFRICAN NATIONAL
SPACE AGENCY

SOUTH AFRICAN NATIONAL SPACE AGENCY

STRATEGIC PLAN - REVISED

2020 - 2025

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ACCOUNTING AUTHORITY STATEMENT

The South African National Space Agency (SANSA) is an entity of government and as such, the Agency has a responsibility to the citizens of South Africa in contributing towards addressing poverty, unemployment and inequality and promoting the development of South Africa.

Space data and technology improves decision-making through the integration of space-based systems with ground-based systems for providing the correct information products at the right time to government and the private sector. This is to be delivered through the National Space Strategy that seeks to utilise innovations and knowledge derived from space science and technology to ensure sustainable development, economic growth, and improvement of life for all.

The key strategic outcomes pursued by SANSA are aligned to the following Department of Science and Innovation (DSI) strategic outcomes as provided in the Department's 2020-2025 Strategic Plan: (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. The SANSA Strategic plan for 2020-2025, thus reflects the entity's alignment with the 2020-2025 Strategic Plan of the DSI and contribution towards transforming and enhancing the responsiveness of the NSI, whilst generating knowledge, skills development, and innovation to grow the industry in space science and technology.

Since its inception in 2011, the South African National Space Agency (SANSA) has taken a conservative approach in the planning and implementation phases of its various programme of activities. The planning for the next five-year cycle provides an ideal opportunity to rethink the programmatic focus of the Agency; and this is especially important given the current financial climate and the need for ensuring the long-term sustainability of SANSA and the local space sector.

Whilst we have still taken a conservative approach in ensuring alignment between the suite of activities we will embark on and the fiscal allocation committed for the next five-years, we have also described aspirational programmes that the Agency will pursue, which is subject to securing the requisite funding, in order to move the National Space Programme closer toward its originally envisaged mandate. The aspirational programmes are subject to the following preconditions, that the Agency is committed to implementing:

1) Raising the additional funding required, in partnership and consultation with government departments and sister agencies.

2) Reviewing the business model and organisational design to position the Agency appropriately, whilst ensuring the long-term sustainability of the organisation.

3) Undertaking an institutional review to ascertain the fit-for-purpose status of SANSA with respect to its delegated mandate, but subject to the financial and human resourcing; and

4) Resetting the organisational culture to embrace a new philosophy of operating, whilst mitigating against any associated risks.

The commitment of programmes against the fiscal allocation will ensure continuity of those activities that have proved successful over the last five years; whilst the pursuit of the aspirational programmes will drive the Agency to greater relevancy and is reflective of the myriad of growth

opportunities that lie before us. These opportunities are, in part, already being implemented and mirrored in the adoption of a new Vision, which is Africa-centric, and a Mission Statement that positions SANSA centrally to the development of the local space sector by providing the appropriate 'leadership' that is required for such development.

Our commitment is premised on the realisation of the powerful impact space has on addressing our manifold socio-economic environmental challenges. Moreover, the development of the Southern African Development Community (SADC) Space Programme and the African Space Programme are clear indications of the realisation of this value proposition to socio-economic environmental development of the region and the continent, respectively. The SANSA has been central to the developments of these programmes, and this provides the Agency with a significant growth potential, which is contingent on how we position and integrate the suite of existing initiatives into these broader programmes.

The Board and management of SANSA remain optimistic and committed to ensuring that the National Space Programme is taken beyond its current nascent state. We are heartened by the philosophy of former President Nelson Mandela, *"It is not where you start, but how high you aim that matters for success".*

I, therefore, embrace this opportunity to present the revised SANSA's Strategic Plan for the 2020 to 2025 five-year cycle and invite all our stakeholders to walk with us as we turn the sector around to embrace a brighter future that is built on a solid foundation that characterises the relevancy, efficiency, and effectiveness of our National Space Programme and its contextual positioning and linkages with the regional and continental space programmes.

Ms Xoliswa Kakana

Chairperson of the SANSA Board (Accounting Authority)

CHIEF EXECUTIVE OFFICER STATEMENT

Transformation across the science, technology, and innovation (STI) space remains a significant focus for the DSI and its entities, and SANSA is committed to transforming the academic and industrial sectors through space knowledge generation, skills and economic development. SANSA is determined to be positioned at the forefront of the National Space Programme and acquire a global market share for small to medium-sized space systems in support of the establishment of a knowledge economy through fostering and promoting innovation and industrial competitiveness and to use space science and technology to develop applications for the provision of geospatial, telecommunication, timing, and positioning of products and services.

This will contribute significantly to the successful implementation of the National Space Policy (NSP), which serves as an overarching guideline to all national space actors on the key principles for the rollout of a South African Space Programme. The NSP and the National Space Strategy (NSS) remain central to the development of this revised SANSA Strategic Plan for the 2020-2025 five-year term, more so given that SANSA has a responsibility of steering the implementation of the space policy and strategy and delivering products and services in accordance with the needs of government amongst other key users.

The revised Department of Planning, Monitoring and Evaluation (DPME) Framework for Strategic Plans and Annual Performance Plans has provided SANSA with an opportunity to review its strategic path and desired outcomes for the period 2020-2025 in alignment with the 2019–2024 Medium Term Strategic Framework and the National Development Plan, Vision 2030.

The repositioning of the South African Space Programme during the coming five-year term is to be pursued in accordance with the SANSA vision of developing *"an integrated National Space Capability that responds to socio-economic challenges in Africa by 2030",* as outlined in this strategic plan. This vision statement is the Agency's response to the strategic and operational environment and will enhance the rollout of key programmes related to 'Earth observation and space exploration', whilst assisting the Agency to strengthen its contribution towards the effective implementation of 'navigation and positioning and satellite communications' programmes in accordance with its mandate.

Daily weather forecasts, instantaneous worldwide communications, and a constant ability to monitor the Earth through satellite images are all examples of space technologies that we have come to rely upon. Even basic commodities, such as food and energy resources, are facilitated by space-based technology. In fact, the high standard of living in developed countries is largely attributed to the adoption and application of space-based technologies. This convenient lifestyle is supported by the instant access to information and space-based applications, such as the Global Positioning System (GPS) and global television coverage. While some of these products and services have helped to serve the social, economic, and environmental needs of the country, we cannot boast of possessing all the requisite capacity to effectively address all of the needs of the country. However, moves are afoot to change this situation by building an indigenous space capability that would fully service the needs of the country and continent, and SANSA is central to these developments.

Based on our situational analysis, SANSA has through its foundational years, spanning between 2011 and 2019, been able to achieve over 80% of its targets committed to from its 2015-2020 Strategic Plan and its respective annual performance plans on an annual basis; but this did not necessarily translate into SANSA achieving its full mandate, as expressed in the National Space Policy (NSP) and National Space Strategy (NSS). The 2015-2020 Strategic Plan was tailored to fit

the funding allocations to SANSA with the following observed challenges during the implementation phase:

1) SANSA has been unable to fulfil its full expected mandate, with the key focus areas of global navigation satellite services and satellite telecommunications not being prioritised during the foundational phase.

2) SANSA has not been able to provide the support expected of it to the broader South African space sector, resulting in a less than optimal growth and development of the industry.

3) SANSA's operational expenses far exceed its parliamentary grant, which has implied that SANSA must generate its own revenue sources to ensure continuity of operations during the foundational phase and, consequently, the organisation having to focus on revenue generating activities; and

4) Whilst the global space sector has grown steadily by approximately 8% per annum, the South African space sector has not been able to secure an appreciative level of the global market share.

It is timely, given the abovementioned challenges and constraints, for SANSA to chart a new trajectory that will ensure that the South African space sector is able to develop and compete globally, whilst responding to the critical needs of its user community, primarily represented by all tiers of government (i.e., national, provincial, and municipal). This necessitates that the Strategic Plan for SANSA be revised to articulate the aspirations of the sector for the next five years spanning 2020 to 2025.

These aspirations, which are captured in a separate section, are in keeping with the expected mandate of SANSA, and the value proposition of achieving this mandate includes:

1) Broader support to the South African space sector.

2) A bigger human capital development programme with an increased absorptive capacity into the local space sector.

3) A broader spectrum of products and services that assists in responding to the nation's socio-economic environmental challenges.

4) A reduced outflow of local capital to foreign markets and an increased market share of the global space industry; and

5) An increasing focus on the African continent and the SADC region through alignment with the implementation of the African Space Strategy and African Space Policy, and the envisioned SADC Space Strategy, and thereby fulfilling South Africa's foreign policy to lead developments on the continent.

Failure to adopt and implement the aspirational segments of this Strategic Plan will mean certain stagnation of the South African space sector. Consequently, the ability of the space sector to respond to the national and continental needs will remain suboptimal, thus affecting the quality of support provided for key decision-making platforms that should be effectively engineered to support governments' priority of addressing the nation's and the continent's socio-economic environmental challenges. It should be highlighted that the concerted drive to secure resources for key initiatives is of critical importance, which has realised recent successes, such as the potential

of securing investor funding for the Space Infrastructure Hub and the current construction of a new Space Weather Centre to support the requirements of the aviation sector on the continent.

This Strategic Plan is intended to relook the mandate of SANSA and thereby extract the key activities that SANSA should be implementing. This exercise has allowed SANSA to take a fresh look at its existing activities and make a realistic assessment of where it should be focusing in the next five years, over and above what it commits to achieving against the parliamentary grant allocation and specific grant allocations. The new vision of SANSA focuses on Africa, and this provides many growth opportunities for SANSA, as the African Space Programme becomes a reality. For this reason, concerted effort will be made in assisting the process of developing the African Space Programme and the envisioned SADC Space Programme and developing and positioning a transformed South African space sector to play a leading role in the implementation phases.

New areas of focus, such as global navigation satellite system (GNSS) services and satellite telecommunications have been earmarked for development in the national space sector; and SANSA will work with the relevant government departments to support the policy processes that will birth these new focus areas, which are deemed vital for South Africa. Expertise that is needed to support these focus areas will be developed internally in SANSA and within the broader space sector. This Strategic Plan provides a basis upon which new funding opportunities could be pursued to ensure that SANSA's full mandate is achieved.

In line with this strategy, SANSA is committed to an outcomes-driven approach that supports the implementation of sustainable programmes aimed at transforming the South African space sector in collaboration with the Department of Science and Innovation, its public entities, and other key stakeholders.

Efforts to mobilise additional resources and review the organisational business model, among others, will be crucial for developing a fit-for-purpose SANSA that is able to lead the development of an integrated national space capacity which is responsive to Africa's socio-economic challenges.

Dr Valanathan Munsami

Chief Executive Officer

OFFICIAL SIGN-OFF

It is hereby confirmed that this Revised Strategic Plan for the South African National Space Agency:

1) Was developed by the management 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 Impact, Outcomes and Outputs, which the South African National Space Agency will endeavour to achieve over the period 2020/21–2024/25.

20 January 2022

Ms Andiswa Mlisa **Date**
MD: Earth Observation

20 January 2022

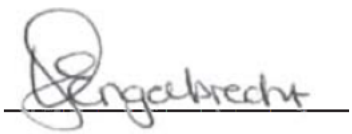
Mr Raoul Hodges **Date**
MD: Space Operations

20 January 2022

Dr Lee-Anne McKinnell **Date**
MD: Space Science

20 January 2022

Mr Amal Khatri **Date**
ED: Space Engineering Programme



20 January 2022

Ms Leonie Engelbrecht **Date**
Chief Financial Officer (Acting)

20 January 2022

Dr Valanathan Munsami **Date**
Chief Executive Officer

20 January 2022

Mr Xoliswa Kakana **Date**
Chairperson of SANSA Board
(Accounting Authority)

APPROVED BY:

10/03/2022

Dr BE Nzimande, MP **Date**
Minister of Higher Education, Science and Innovation
(Executive Authority)

ABBREVIATIONS AND ACRONYMS

AfCFTA	African Continental Free Trade Agreement
AfriGEO	African Group on Earth Observations
AIT	Assembly Integration and Testing
ARC	Agricultural Research Council
ARMC	African Resource Management Constellation
AU	African Union
B-BBEE	Broad-Based Black Economic Empowerment
BRICS	Brazil, Russia, India, China, and South Africa
Cal-Val	Calibration and validation
CEOS	Committee on Earth Observation Satellites
CNES	National Centre for Space Studies (France)
COTS	Commercial Off-The-Shelf
Covid-19	Coronavirus Disease 2019
CSIR	Council for Scientific and Industrial Research
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
DPME	Department of Planning, Monitoring and Evaluation
DSI	Department of Science and Innovation
DSN	Deep Space Network
dtic	Department of Trade, Industry and Competition
DTPS	Department of Telecommunications and Postal Services
ED	Executive Director
EGNOS	European Geostationary Navigation Overlay Service
EO	Earth Observation
EODC	Earth observation Data Centre
ERRP	Economic Reconstruction and Recovery Plan
ESA	European Space Agency
FDI	Foreign Direct Investment
FPGA	Field-Programmable Gate Array
FY	Financial Year
GAGAN	GPS-aided GEO Augmented Navigation
GEO	Group on Earth Observations
GNSS	Global Navigation Satellite Services

GPS	Global Positioning System
GDP	Gross Domestic Product
GNSS	Global Navigation Satellite System
GTAC	Government Technical Advisory Centre
HESTI	Higher Education, Science, Technology, and Innovation
HESTIIL	Higher Education, Science, Technology, and Innovation Institutional Landscape
HF	High Frequency
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communications Technology
IMF	International Monetary Fund
IP	Intellectual Property
ISO	International Organization for Standardization
LOFAR	Low-Frequency Array
MD	Managing Director
MHz	Megahertz
MTSF	Medium-Term-Strategic-Framework
NASA	National Aeronautics and Space Administration
NDP	National Development Plan
NEET	Not in Employment, Education or Training
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organisation
NMISA	National Metrology Institute of South Africa
NRF	National Research Foundation
NSI	National System of Innovation
NSP	National Space Policy
NSS	National Space Strategy
OECD	Organisation for Economic Co-operation and Development
PFMA	Public Finance Management Act, (Act No. 1 of 1999), (as amended by Act No. 29 of 1999)
PG	Parliamentary Grant
PhD	Doctor of Philosophy
PICC	Presidential Infrastructure Coordinating Commission
PS	Products and Services
PWD(s)	People With Disability/ies
R&D	Research and Development
SAASTA	South African Agency for Science and Technology
SBAS	Satellite-Based Augmentation Systems
SADC	Southern African Development Community
SAEOSS	South African Earth Observation Systems Strategy

SAMA	South Atlantic Magnetic Anomaly
SANDIMS	South African National Geophysical Data and Instrumentation Management System
SANSA	South African National Space Agency
SAR	Synthetic Aperture Radar
SAWS	South African Weather Service
SBAS	Satellite-based Augmentation System
SDG	Sustainable Development Goal
SDR	Software Defined Radio
SE	Space Engineering
SET	Science, Engineering, and Technology
SETI	Science, Engineering, and Technology Institution
SIDS	Sustainable Infrastructure Development Symposium of South Africa
SIH	Space Infrastructure Hub
SIP22	Strategic Investment Project
SME	Small to Medium Enterprise
SMME	Small, Medium and Micro Enterprise
SO	Space Operations
SQUID	Superconducting Quantum Interference Device
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
SWC	Space Weather Centre
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TRL	Technology Ready Level
TT&C	Telemetry, Tracking and Command
TVET	Technical and Vocational Education and Training
UN	United Nations
US/USA	United States of America
VHF	Very High Frequency
VSAT	Very-Small-Aperture Terminal
WYPWD	Women, Youth, and People with Disabilities

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PART A: OUR MANDATE

1. CONSTITUTIONAL MANDATE

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".*

2. LEGISLATIVE AND POLICY MANDATES

2.1. LEGISLATIVE MANDATES

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).

2.1.1. ENABLING LEGISLATION

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 of South Africa.

The Space Affairs Act is currently being updated in line with current policy drivers for a National Space Programme, particularly industrial development, as opposed to the policy driver of non-proliferation of dual-use technology in the early 1990s.

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 enabled 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 cooperation 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.

2.1.2. OTHER KEY LEGISLATION

In addition to the above establishment legislation, SANSA's work is governed by a broad legislative framework, including the following key legislation:

Table 1: Key legislation, including pending amendments, governing SANSA's work

NAME OF ACT, AS AMENDED	KEY IMPLICATIONS
Public Finance Management Act (No. 1 of 1999)	Provides the basis for the management of public funds by public entities listed in terms of the PFMA: ▪ SANSA is listed as a Schedule 3A National Public Entity and is obligated to adhere to the requirements and principles of the Act. ▪ The Act makes provision for the development of measurable objectives aligned with the annual budget and embodies the legislative reporting requirements. It governs the supply chain management and audit functions of SANSA.
Science and Technology Laws Amendment Act (No. 9 of 2020)	Amends the establishment legislation of a number of 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.
National Key Point Act (No. 102 of 1980)	Provides for the declaration and protection of sites of national strategic importance against sabotage, as determined by the Minister of Police since 2004, and the Minister of Defence before that.
Critical Infrastructure Protection Act (No. 8 of 2019)	Will repeal the National Key Point Act, providing for matters related to the identification and declaration of infrastructure as critical infrastructure. Once the Act comes into effect, SANSA would need to apply for classification of its facilities under this Act and no longer under the National Key Point Act.
South African Space Industry Regulatory Bill	Will be promulgated by the dtic and 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.
Broad governance and administration legislation, amongst others:	▪ Promotion of Access to Information Act (No. 2 of 2000) ▪ Skills Development Act (No. 97 of 1998) ▪ Broad-Based Black Economic Empowerment Act (No. 53 of 2003)

NAME OF ACT, AS AMENDED	KEY IMPLICATIONS
	▪ Intergovernmental Relations Framework Act (No. 13 of 2005) ▪ Preferential Procurement Policy Framework Act (No. 5 of 2000) ▪ Occupational Health and Safety Amendment Act (No. 181 of 1993)

2.2. POLICY MANDATES

Aligned to the legislative instruments above, the National Space Policy provides an overarching guideline to all national space actors on the key principles for implementation of a South African Space Programme. The National Space Policy is an instrument of the dtic and is aligned to the Space Affairs Act.

The National Space Policy is the anchor tenet and reference point by which all other policy and strategy instruments are crafted. The primary objectives of the National Space Policy are to:

1) Improve coordination throughout the South African space arena to maximise the benefits of current and planned space activities; avoid or minimise duplication of resources and efforts; and organise existing initiatives, programmes, and institutions into a coherent network for all providers and users of space systems.

2) Promote capacity building initiatives, both as a means towards effective participation in the space arena, as well as to develop capacity in space science and technology, and science and technology in general.

3) Facilitate the provision of appropriate and adequate space capabilities to support South Africa's domestic and foreign policy objectives.

4) Foster a robust science and technology base in research institutions and the higher education sector.

5) Promote the creation and implementation of a supportive regulatory environment to facilitate industrial participation in the space arena, in accordance with domestic law and South Africa's foreign policy objectives and international obligations.

6) Promote the development of an appropriate and competitive domestic commercial space sector to provide the industrial base to meet the nation's needs for space technology.

7) Promote improved cooperation with other nations in the mutually beneficial peaceful uses of outer space.

8) Promote greater awareness and appreciation, at all levels of South African society, of the relevance and benefits of space science and technology.

2.2.1. DEVELOPMENTAL PRIORITIES

The strategic architecture of SANSA as a public entity in South Africa is informed by the following developmental priorities.

Table 2: Developmental policy mandates

POLICY	KEY IMPLICATIONS
National Development Plan, Vision 2030	The National Development Plan 2030 is aimed at eliminating poverty and reducing inequality by 2030. The Plan comprises of thirteen chapters, inclusive of a set of objectives and actions for each, which details how government intends to respond on different fronts to the manifold challenges facing South Africa.
UN Sustainable Development Goals (SDGs)	South Africa has committed to the global Agenda 2030, commonly referred to as the SDGs, which comprises of 17 sustainable development goals (SDGs) and 169 key indicators. The SDGs set a common sustainable development agenda for pursuit by all signatory nations, including South Africa.
African Union Agenda 2063	Aligned to the UN SDGs, the African Union Agenda 2063 reflects the seven aspirations for a prosperous, well-governed, peaceful, united, and influential global player and partner.
Medium Term Strategic Framework (MTSF) 2019-2024	Sets out seven priorities in terms of which the sixth administration has chosen to focus on for the MTSF period, 2019 and 2024. SANSA contributes most directly to: ▪ Priority 1: A capable, ethical, and developmental State. ▪ Priority 2: Economic transformation and job creation. ▪ Priority 3: Education, skills, and health. ▪ Priority 7: A better Africa and World. *The alignment of SANSA's outcomes to the MTSF priorities is reflected in Part C of this Strategic Plan.*
District Development Model (DDM)	Aims at improving 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. *SANSA's contribution to the DDM is attached as an annexure to this strategic plan.*
South African Economic Reconstruction and Recovery Plan (2020) (ERRP)	In response to the deepening economic crisis brought on by the Covid-19 pandemic and the various levels of lockdown since March 2020, the President, Mr Cyril Ramaphosa, communicated South Africa's ERRP, which has three phases: 1) Engage and Preserve - which includes a comprehensive health response to save lives and curb the spread of the pandemic.

POLICY	KEY IMPLICATIONS
	2) Recovery and Reform - which includes interventions to restore the economy while controlling the health risks. 3) Reconstruct and Transform - which entails building a sustainable, resilient, and inclusive economy. *SANSA's contribution to the nine priorities of the ERRP is discussed in the next section.*

3. INSTITUTIONAL POLICIES AND STRATEGIES GOVERNING THE FIVE-YEAR PLANNING PERIOD

3.1. INSTITUTIONAL STRATEGIES

The National Space Strategy and the South African Earth Observation Systems (SAEOS) Strategy provide directives that directly inform the operationalisation of the South African Space Programme, inclusive of the role that SANSA should play. The National Space Strategy provides a blueprint for the innovative utilisation of space science and technology to enhance economic growth and sustainable development.

3.1.1. NATIONAL SPACE STRATEGY

The National Space Strategy seeks *"for South Africa to be among the leading nations in the innovative utilisation of space science and technology to enhance economic growth and sustainable development and thus improve the quality of life for all".* The primacy in pursuing this vision is embedded in three primary goals, namely:

1) To capture a global market share for small to medium-sized space systems in support of the establishment of a knowledge economy through fostering and promoting innovation and industrial competitiveness.

2) To empower better decision-making through the integration of space-based systems with ground-based systems for providing the correct information products at the right time.

3) To use space science and technology to develop applications for the provision of geospatial, telecommunication, timing, and positioning products and services.

3.1.2. SOUTH AFRICAN EARTH OBSERVATION SYSTEMS STRATEGY

Given the critical importance of Earth observation applications for informing decision-making and evidence-based policy making in government spheres, the objective of the SAEOS Strategy is to coordinate the collection, assimilation, and dissemination of Earth observation data and information. This is deemed to be achieved through:

1) Identifying and correcting shortcomings in the sampling, data processing, systems modelling, and information dissemination processes.

2) Ensuring that the information needs of users are met, in the form that they require, when they need it, and at an affordable cost.

3) Exploiting the opportunities for synergy and cost saving between previously separate systems by, among other things promoting the development of open, interoperable information and communications technologies for Earth observation.

4) Developing or promoting standards for Earth observation information interchange.

5) Ensuring that crucial datasets are securely archived.

6) Creating value enhanced datasets by linking together previously standalone, incompatible, and mutually inaccessible observations, and by linking observations with models.

7) Accessing relevant data from observation systems in neighbouring countries and from global observation systems, and in return supplying data needed for the solution or regional or global problems.

3.1.3. EMERGING POLICY SHIFTS IN SCIENCE, TECHNOLOGY, AND INNOVATION

The 2019 White Paper on Science, Technology and Innovation introduces several policy shifts, *inter alia*:

1) Increasing the focus on inclusivity, transformation, and linkages in the NSI.

2) Enhancing the innovation culture in society and government.

3) Improving policy coherence and budget coordination across government.

4) Developing a more enabling environment for innovation.

5) Developing local innovation systems.

6) Supporting social and grassroots innovation.

7) Expanding the research system.

8) Developing human capabilities.

9) Accelerating the implementation of the pan-African STI agenda.

10) Increasing investment in the NSI.

Table 3: Emerging policy imperatives, with a future impact on SANSA

POLICY	KEY IMPLICATIONS
Science, Technology and Innovation (STI) Decadal Plan (Draft, May 2021)	The STI Decadal Plan is being developed to serve as the implementation plan for the 2019 White Paper. There are nine priorities against which to align once the Decadal Plan is finalised. SANSA has given a comprehensive response to the

POLICY	KEY IMPLICATIONS
	DSI on the draft Plan and awaits finalisation as it is expected to bring about significant change to the policy environment. 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 of the Decadal Plan. The strategic outcomes in this revised Strategic Plan provide evidence of space science and technology deliverables on the identified themes in the Decadal Plan, as follows: ▪ Modernise sectors, including support for SMEs and co-operatives. ▪ Exploit new sources of growth – for competitiveness and job creation. ▪ Support social progress – economic inclusivity and sustainable livelihoods. ▪ Utilise technological advancement to contribute to an STI-enabled capable State – for improved service delivery and decision-making. ▪ Increase support for responsible environmental custodianship and respond effectively to climate change.
Higher Education, Science, Technology and Innovation Institutional Landscape (HESTIIL) Review Report (2020)	Purpose – to investigate the extent to which the HESTIIL is able to optimally assist in the achievement of the NDP priorities and to respond to the country's socio-economic needs. To propose – interventions to pivot the NSI towards a higher growth trajectory and performance level. SANSA is to take the lead from DSI in aligning with the strategic levers of change, namely: ▪ A values base that is consistent with NDP vision. ▪ Institutional governance that will ensure collaboration and coordination. ▪ A smart resourcing plan that will optimise and sustain the funding base for HESTI. ▪ Enhancement of necessary capabilities for innovation and management. ▪ A measured and progressive implementation of institutional changes and RDI societal grand challenges or missions to deliver system coherence and synergy.
Game Changer: **Strategic Investment Project (SIP22): Space Infrastructure Hub (SIH)**	The Space Infrastructure Hub is a vehicle for SANSA to develop satellites for Earth observation and various space missions, build a new ground station, develop an expanded data segment, and build a new data visualisation centre, activate the satellite-based

POLICY	KEY IMPLICATIONS
	augmentation system over southern Africa, and develop human capital. A total of R4.47 billion has been secured through the Sustainable Infrastructure Development Symposium (SIDS), where the SIH was recognised as one of the top five most promising projects, falling with the 'digital infrastructure' category. It is a significant opportunity to build on indigenous space capability to service the needs of the country. Once the funding becomes available, it will be delivered over a period of three years, with an expected rate of return of 11% over ten years. It will have major implications for SANSA and provide the much-needed revenue injection to execute SANSA's mandate.

3.1.4. LINKING SPACE TO GOVERNMENT POLICIES AND DEVELOPMENTAL PRIORITIES

The highest priority of any government is to ensure (i) sustained economic growth and (ii) improvement in the quality of life of its citizens. It is, therefore, imperative that investments in space science and technology are geared towards addressing these fundamental priorities. In fact, the notion of a National Space Programme is premised on the potential benefits that can accrue to the country from directed investments in developing the local space sector.

The process for drafting the National Space Strategy included extensive consultation with national government departments to ascertain what the key priorities for a National Space Programme should be. This methodology for framing the National Space Programme has significant implications for achieving the broader policy mandate of government. The key priorities of government that need to be addressed by a National Space Programme was collated and clustered into three key priority areas, namely:

1) Environmental resource management.

2) Health, safety, and security; and

3) Innovation and economic growth.

Each of these clusters further comprise of a list of associated user needs. A summary of this exercise is shown in Table 4 below. It is important to note that the success of the National Space Programme will be assessed by how well these user needs are responded to, and whether the appropriate data and information has been provided on time and is of an acceptable quality standard. In addition, the use of the predefined data and information reside in different and multiple government departments, where these specific datasets could have multiple uses.

Table 4: Clustering government priorities and National Space Programme user needs

ENVIRONMENTAL RESOURCE MANAGEMENT	HEALTH, SAFETY AND SECURITY	INNOVATION AND ECONOMIC GROWTH
▪ Environmental and geospatial monitoring. ▪ Ocean, coastal and marine management. ▪ Land management. ▪ Rural development and urban planning. ▪ Topographic mapping. ▪ Hydrological monitoring. ▪ Climate change adaptation and mitigation. ▪ Meteorological monitoring.	▪ Disaster monitoring and relief. ▪ Hazards forecasting and early warning. ▪ Cross-border risk ▪ Disease surveillance and health risk. ▪ Asset monitoring. ▪ Regulatory enforcement. ▪ Defence, peacekeeping, and treaty monitoring.	▪ Tourism and recreation. ▪ Communications. ▪ Space science and exploration. ▪ Space technology transfer and spinoffs. ▪ Development of the space industry.

South Africa is burdened with the triple challenge of poverty, inequality, and unemployment and resolving this challenge will emancipate the marginalised communities of South Africa to their full economic and social potential. Space science finds resonance with the triple challenges and contributes towards addressing these as follows:

1) Poverty: Broaden opportunities through education, health, nutrition, public transport, and access to information through the delivery of essential services using space-based platforms.

2) Inequality: Drive unity and social cohesion through understanding the impacts of social and economic divisions using geospatial information.

3) Unemployment: Inform the removal of structural impediments, such as poor-quality education or spatial settlement patterns that exclude the majority.

Taking the user needs identified in Table 4 as the primacy of the National Space Programme, Table 5 below reflects how many priorities of the abovementioned policy instruments are impacted by each of these user needs in terms of the 13 chapters of the NDP, 2030, the seven priorities of MTSF 2019-2024, the 17 SDGs and nine priorities of the ERRP.

Table 5 reinforces the critical role and impact that space science and technology can play in realising the many aspirations of government in bringing about radical socio-economic environmental change within the country.

Table 5: Space programme response to the priorities of government

PRIORITY AREAS	NDP (13)	TRIPLE CHALLENGE	MTSF (7)	SDGS (17)	ERRP (9)
Environmental and geospatial monitoring	7	3	5	2	3
Ocean, coastal, and marine management	8	3	5	3	5
Land management	10	3	7	3	5
Rural development and urban planning	13	3	7	2	7
Topographic mapping	5	2	7	15	2
Hydrological monitoring	12	3	7	2	4
Climate change adaptation and mitigation	13	2	7	1	5
Meteorological monitoring	8	2	5	5	4
Disaster monitoring and relief	11	2	5	3	2
Hazards forecasting and early warning	11	2	5	5	3
Cross-border risk	8	3	4	2	3
Disease surveillance and health risk	9	2	4	1	4
Asset monitoring	5	3	5	2	4
Regulatory enforcement	5	3	7	17	2
Defence, peacekeeping, and treaty monitoring	4	2	4	1	3
Tourism and recreation	6	3	5	16	5
Communications	9	3	7	17	6
Space science and exploration	8	3	5	3	4
Space technology transfer and spinoffs	4	3	4	4	9
Development of the space industry	4	2	5	3	4

Given the adverse impact of the Covid-19 pandemic on the South African economy and thus the importance of aligning with South Africa's Economic Reconstruction and Recovery Plan, SANSA has assessed in detail its contribution to the ERRP for the remainder of the planning period – summarised in the table below.

Table 6: Alignment of SANSA's key deliverables to ERRP objectives

ERRP OBJECTIVES	SANSA KEY DELIVERABLES
To create jobs, primarily through aggressive infrastructure investment and mass employment programmes.	Prioritisation of infrastructure development through the following flagship projects: ▪ Development of an operational Space Weather Centre. ▪ Development of Digital Earth South Africa. ▪ An upgraded Assembly Integration and Testing (AIT) Facility.
To reindustrialise our economy, focusing on growing small businesses.	Small to medium enterprises to benefit from 30% of SANSA expenditure of the parliamentary grant.
To accelerate economic reforms to unlock investment and growth.	▪ Enhanced benefit for the space programme through international, African, and national partnerships (including collaboration with our BRICS partners). ▪ Generation of income from space operations activities to promote growth of the local space sector.
To fight crime and corruption.	Initiatives to promote good governance and transform SANSA into a high-performing agency.
To improve the capability of the State.	▪ Youth awareness and skills development initiatives. ▪ Creation of opportunities to enhance the national capability through cutting–edge research and development, innovation, and expertise for the implementation of key space initiatives

In developing this Strategic Plan, SANSA has taken into consideration the strategic outcomes of 2020-2025 Strategic Plan of the DSI, which are:

1) A transformed, inclusive, responsive, and coherent NSI - over the next five years expand, transform, and enhance the responsiveness of the NSI.

2) Increased knowledge generation and innovation output - over the next five years, to maintain and increase the relative contribution of South African researchers to global scientific output.

3) Human capabilities and skills for the economy and for development - over the next five years improve the representivity of high-end skills and increase the development of technical and vocational skills for the economy.

4) Knowledge utilisation for economic development - over the next five years improve the sustainability and competitiveness of traditional sectors of the economy and initiate/continue research and development in emerging/nascent technology areas.

5) Knowledge utilisation for inclusive development - over the next five years, expand the use of scientific knowledge (as evidence) in support of innovation for societal benefit and public good.

6) Innovation in support of a capable and developmental State - over the next five years, increase the use of innovation as an enabler in the delivery of efficient services and access to government programmes.

SANSA's alignment with these outcomes is discussed in Part C of this Strategic Plan.

4. RELEVANT COURT RULINGS

At the time of developing the revised SANSA Strategic Plan for 2020–2025, 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 (No. 36 of 2008) to the extent possible, given the resources at its disposal.

PART B: OUR STRATEGIC FOCUS

1. VISION

SANSA's vision statement for repositioning the South African Space Programme is:

"An integrated National Space Capability that responds to socio-economic challenges in Africa by 2030".

2. MISSION

SANSA's mission statement for what it is the South African Space Programme does is:

"To provide leadership in unlocking the potential of Space for the advancement and benefit of humanity".

3. VALUES

Table 7: SANSA's six core values

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.

4. SITUATIONAL ANALYSIS

4.1. 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 2022[1].

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 1990s[2].

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 2020[3].

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 years[4] 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 five-year term covered by this strategy.

[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.*

4.1.1. PESTLE ANALYSIS

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

Table 8: 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?	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. 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.
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?	The budget allocation is suboptimal and insufficient to run a National Space Programme, particularly to operationalise and sustain key programmes and meet user needs. 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. Adequate investment will support the longer-term strategic horizon of commercialisation and revenue growth for enhanced sustainability.
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?	▪ 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 bourgeoning 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?	▪ 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?	▪ **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?	▪ 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?	▪ 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 IS09000 Quality Standard across organisation.
Legal factors	
What legal implications can affect SANSA's work?	▪ **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 IS045000 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
	and best practices needs to be instituted to ensure adherence to the regulatory frameworks. ▪ **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.
How does SANSA mitigate risks?	▪ 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.
What external legal changes can affect the organisation?	▪ 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.
Environmental factors	
How does SANSA engage on environmental issues?	SANSA plays a significant role in the implementation of the SDGs, but this work needs to be consolidated and elevated in the public space.
Is SANSA responding to industry needs?	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.
How do investors see SANSA?	▪ 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.
How is SANSA responding to industry transformation?	▪ SANSA is establishing a cloud platform for data discovery and dissemination with analysis ready EO data for black SMME's.

QUESTION	IMPLICATIONS FOR SANSA
	▪ SANSA is establishing criteria for black SMME's in the private sector access for commercial data under multi-user license. ▪ Increase spending with black SMME's through subcontracting on tenders. ▪ Support the local industry through the AIT facility upgrade.

4.1.2. 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 9 below, which forms a convenient technical reference map for SANSA's key programmes and activities in meeting government's needs.

Table 9 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 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 9: Meeting the full mandate of SANSA

Key Priority Areas	Specific Needs	Earth Observation										Navigation & Positioning	Communication	Space Exploration
		Spatial Resolution Required								Temporal Frequency	Geographic Area			
		< 50cm	50cm - 1m	1m - 2.5m	2.5m - 5m	5m - 10m	10m - 20m	20m - 30m	>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	•	•	•
	Meteorological monitoring		•	•	•	•	•	•	•	Daily	SADC	•	•	•
Health, Safety & Security	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	•	•	•
	Defence, peacekeeping and treaty monitoring	•	•	•		•			•	High turn around time	Africa	•	•	•
Innovation & Economic Growth	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

astronomy[5]. 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:

1) Additional investments were secured, and

2) Relevant structural reforms were made to optimise cross-collaboration with other public entities.

4.2. 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.

4.2.1. REFLECTION ON PAST PERFORMANCE

Table 10 below shows the progress made by SANSA in relation to the approved 2015-2020 Strategic Plan and the targets set against that plan. It should be noted that several indicators articulated in the Strategic Plan were eliminated, due to either funding constraints or that they reflect operational targets – for which approval was sought over the five-year term. The greatest challenge experienced over the period related to delays in completing the EO-Sat1 project.

Table 10: Performance in terms of the strategic goals of the 2015-2020 Strategic Plan

STRATEGIC GOAL	STRATEGIC OBJECTIVE	KEY PERFORMANCE INDICATOR / MEASURE	STRATEGIC PLAN FIVE-YEAR TARGET	FIVE-YEAR ACTUAL
Goal 1: Address South Africa's challenges through space services and products.	S1.1. Lead and facilitate the creation of high-impact applications to address society's needs and challenges.	M1.1. The number of national high-impact applications.	22	23

[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.*

STRATEGIC GOAL	STRATEGIC OBJECTIVE	KEY PERFORMANCE INDICATOR / MEASURE	STRATEGIC PLAN FIVE-YEAR TARGET	FIVE-YEAR ACTUAL
Goal 2: Lead high-impact collaborative R&D on a national scale.	S2.1. Increase the national space research output.	M2.1. The national research productivity score for space support R&D.	5 800	8 941
Goal 3: Develop national human capacity and ensure transformation.	S3.1. Increase youth awareness of science.	M3.1. The number of youth directly engaged.	66 550	121 640
	S3.2. Support students and interns.	M3.2. The number of students and interns. supported for formalised training.	262	321
Goal 4: Enhance the competitiveness of the South African space industry.	S4.1. Generate greater benefit for the space programme through space operations activities.	M4.1. 1. Successful satellite pass monitoring rate for Earth observation.	98%	99.74%
		M4.1.2. Total income generated from space operations activities.	R286.3 million	R405 million
	S4.2. Grow the national space industry.	M4.2.1. The number of direct jobs supported externally through SANSA programme contracting.	204	54

Priorities relating to skills development for women and youth:

Addressing the high rate of youth unemployment in South Africa is a topmost priority of government, requiring the intervention of all public institutions. SANSA's research, human capacity, and transformation programmes have given focused attention to engaging with the youth and providing them with opportunities to be trained and gain employment in space-related industries. As reflected in the above table, SANSA has exceeded all targets relating to youth development in the previous term. Looking ahead, SANSA will be closely monitoring the effectiveness of its youth (student) development programmes by tracking the proportion of students that have been absorbed by the formal economy following the various forms of training and support provided by SANSA. The gender distribution of the Student Development Programme is broadly split equally between males and females.

In the period 2016/17 to 2020/21, SANSA's APP performance rate has averaged 87%, building on the 77% average performance rate between 2011/12 to 2015/16. Over this period, SANSA's annual performance plans and strategic plans have been pragmatically aligned against the budgetary allocations made to it for both its internal business operations and broader support to

the local space sector. This approach vis-à-vis the budgetary allocations imposed a limitation on SANSA's scope of initiatives that were planned and implemented versus implementation of initiatives needed to achieve the full mandate. However, this does not necessarily translate into SANSA implementing its full scope of activities and the need, therefore, arises to take a mandate-based approach to identify what is required of SANSA at a national level.

A consequence of the alignment of SANSA activities to the funding only is as follows:

1) SANSA's inability to fully meet its mandate, especially with regards to global navigation satellite system (GNSS) services, and satellite telecommunications solutions and applications; and

2) Limited support to the local space industry, as per SANSA's mandate.

This situation necessitates that SANSA raises a sustained base funding to support its mandate. However, this warrants that SANSA defines a predetermined strategic direction that will inform its funding requirements to support the local space sector and its growing internal operations to effectively respond to its end user requirements. In its effort to support the local industry, SANSA will work closely with the broader space industry.

4.2.2. 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.

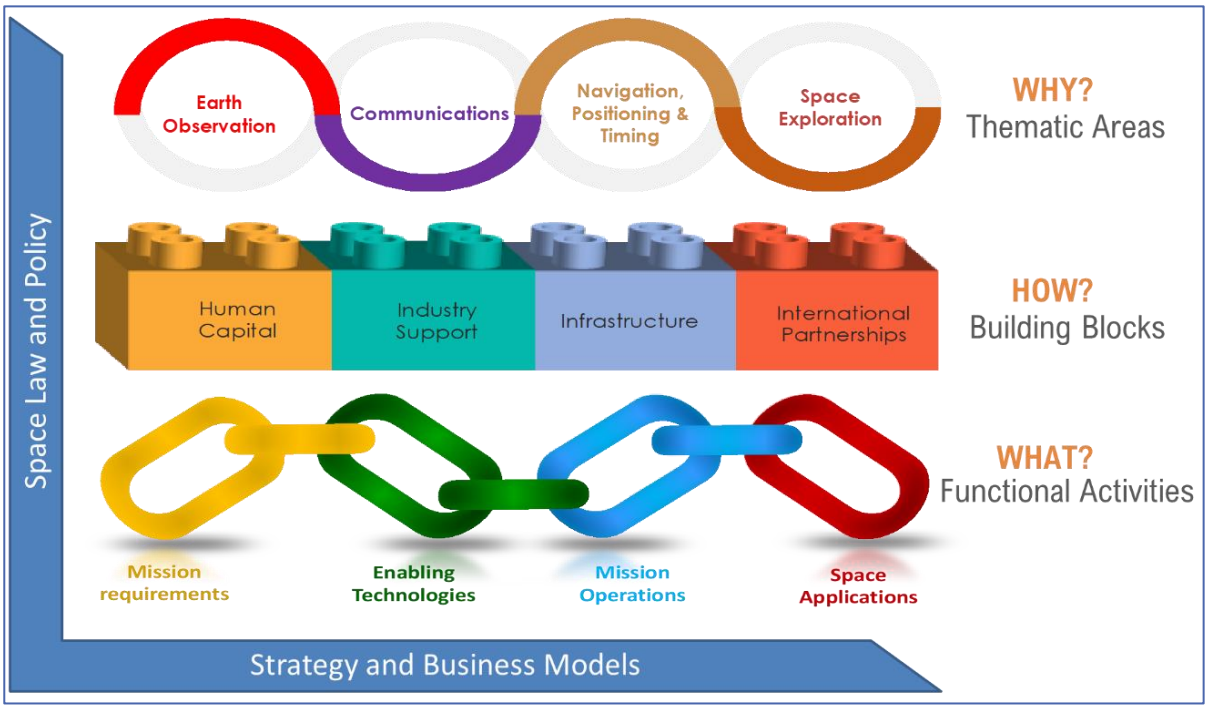
   c) Operations of mission, to

   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 1: 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.

Sustainability considerations:

Some of the outcome indicators reflect upper threshold targets, based on the assumption that certain of SANSA's suite of aspirational initiatives will bear on the effectiveness of SANSA fulfilling its mandate in a more comprehensive manner. This approach is intended to demonstrate the full value SANSA can deliver to the broader public and the local industry, thus ensuring full delivery on its mandate as enshrined in the SANSA Act and policy mandate. The value proposition for the aspirational initiatives include:

1) Broader support to the South African space sector, including extended support to small and medium enterprises.

2) An enhanced human capital development programme in line with the extended mandate, thus ensuring better absorption of the human capital development pipeline into the broader space sector.

3) A wider array of space application products and services, which creates decision-making efficiencies that ultimately impact on how we respond to our socio-economic environmental challenges.

4) A reduced outflow of local capital to foreign markets, which will be offset by technology localisation and a growing market share of the approximately 350-billion-dollar global space market.

5) An increased national infrastructure platform that provides data and information that allows for the development of domestic capability, and places South Africa on the map as the leading African nation in space know-how.

6) A greater focus on the African continent to tackle global challenges that transcend national boundaries, thus effectively contributing to the African Union (AU) Vision and Agenda 2063 for “an integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena”.

To achieve the above value proposition will require a long-term plan for financial sustainability and leadership for SANSA.

4.2.3. 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 some recruitment is underway in preparation for the implementation of key strategic projects, such as the Space Infrastructure Hub (SIH) and Space Weather Centre (SWC), budgetary constraints remain a constraint to reducing the vacancy rate.

Should SANSA manage to secure the required SIH funding and additional funds for the operationalisation of the SWC, 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 (PG) is not adequate for project planning and implementation given that it primarily covers the Agency’s operational costs.

There are several critical human resource gaps that are unfunded, including but not limited to, capacitating the Information Communication Technology (ICT) function and the Programme Management Office, which require additional project managers and system engineers to support the implementation of key projects and to optimise existing programmes and facilities, such as the concurrent engineering facility. While it is preferable for SANSA to build the capabilities internally to plan, develop and sustain programmes, the outsourcing option is being pursued until funding becomes available.

Modelling of the SIH reflects that it cannot be commercialised in full and generate adequate revenue to cover the operational requirements. Additional budget will, therefore, be required from the State to fully operationalise and sustain the SIH.

In addition to the permanent staff complement, SANSA had a total of 36 non-permanent employees in its employ at the end of the 202/21 financial year, as compared to 19 in 2011.

The organisation has made solid progress in advancing the transformation agenda in the organisation. The table below shows a comparison between the demographics of the employee base from the establishment of SANSA on 1 April 2011 and the status as of 31 March 2021. The employment numbers provided in the table below are for the different categories of designated groups and occupational levels.

Table 11: SANSA employment equity status (permanent employees)

OCCUPATIONAL LEVELS	YEAR END	MALE				FEMALE				PERSONS WITH DISABILITIES		TOTAL
		A	C	I	W	A	C	I	W	Male	Female	
Top Management	2011	2	0	0	0	1	0	0	0	0	0	3
	2021	0	0	1	0	0	0	0	0	0	0	1
Senior Management	2011	1	0	0	9	4	0	1	2	0	0	17
	2021	1	0	1	1	1	0	0	2	0	0	6
Professionally Qualified (Mid-management)	2011	2	3	2	8	4	2	1	4	0	0	26
	2021	9	2	5	19	14	0	2	5	1	0	57
Skilled Technical & Academically Qualified	2011	11	1	1	11	14	1	1	8	1	0	49
	2021	35	5	4	10	29	4	1	9	0	0	97
Semi-skilled	2011	14	2	2	8	9	0	0	0	0	0	35
	2021	10	2	0	1	10	4	0	0	0	0	27
Unskilled/Interns	2011	11	0	0	0	3	0	0	0	0	0	14
	2021	2	0	0	0	3	0	0	0	0	0	5
TOTAL	**2011**	**50**	**6**	**5**	**41**	**39**	**3**	**4**	**14**	**1**	**0**	**163**
	2021	**57**	**9**	**11**	**31**	**57**	**8**	**3**	**16**	**1**	**0**	**193**
Percentage change:	**2011-2021**	**39%**	**50%**	**120%**	**-14%**	**63%**	**167%**	**0%**	**14%**	**0%**	**0%**	
Percentage of total	**2011**	**28.5%**	**4.2%**	**3.5%**	**25%**	**24.3%**	**2.1%**	**2.1%**	**9.7%**	**0.7%**	**0.0%**	
		61.1%				**38.2%**				**0.7%**	**0%**	
Percentage of total	**2021**	**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	**2011**	9	0	0	5	4	0	1	0	0	0	**19**
	2021	6	0	0	11	13	3	0	3	0	0	36

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. There has, unfortunately, not been progress in increasing the number of people with disabilities that are employed by SANSA. Efforts need to be stepped up to change this situation over the next five years.

Generally, across the categories, there has been good progress in increasing the representation of the designated groups at SANSA with the number of white males decreasing by 14% while all other racial groups have increased significantly. In 2021, 53% of the non-permanent employees are females, of which a total of 16 are black (African, 13 and Coloured, 3). This compares favourably to the 4 African non-permanent females that were employed in 2011.

Improving SANSA's employment equity profile to align with the Department of Labour proposed Sectorial Equity Targets will continue to be a focus over the planning period.

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.

4.3. SWOT ANALYSIS

The SWOT analysis reflected in the table below is followed by a reflection on how the various elements will be dealt with in planning.

Table 12: SANSA SWOT Analysis

STRENGTHS	WEAKNESSES
▪ 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.	▪ 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.

STRENGTHS	WEAKNESSES
▪ 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.	▪ 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 an unqualified audit outcome with no material matters in the last two financial years. ▪ Non-compliance to B-BBEE is affecting SANSA's funding opportunities.

OPPORTUNITIES	THREATS
▪ 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. ▪ 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.	▪ 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. ▪ 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.

4.3.1. BUILDING ON THE STRENGTHS

The following reflects how SANSA will build upon its inherent 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.

4.3.2. ADDRESSING THE WEAKNESSES

The inherent weaknesses of SANSA will be addressed as follows:

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.

4.3.3. CAPITALISING ON THE OPPORTUNITIES

External opportunities that are presented to SANSA will be capitalised upon in the following manner:

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.

4.3.4. MANAGING THE THREATS

External threats posed to SANSA will be circumvented through the following interventions:

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.

4.4. KEY SUCCESS AREAS AND STRATEGIC PRIORITIES INFORMING PLANNING

SANSA's strategic path towards stimulating a capable and globally competitive South African space sector is underpinned by several key success areas, 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 African 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 system (GNSS) services 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.

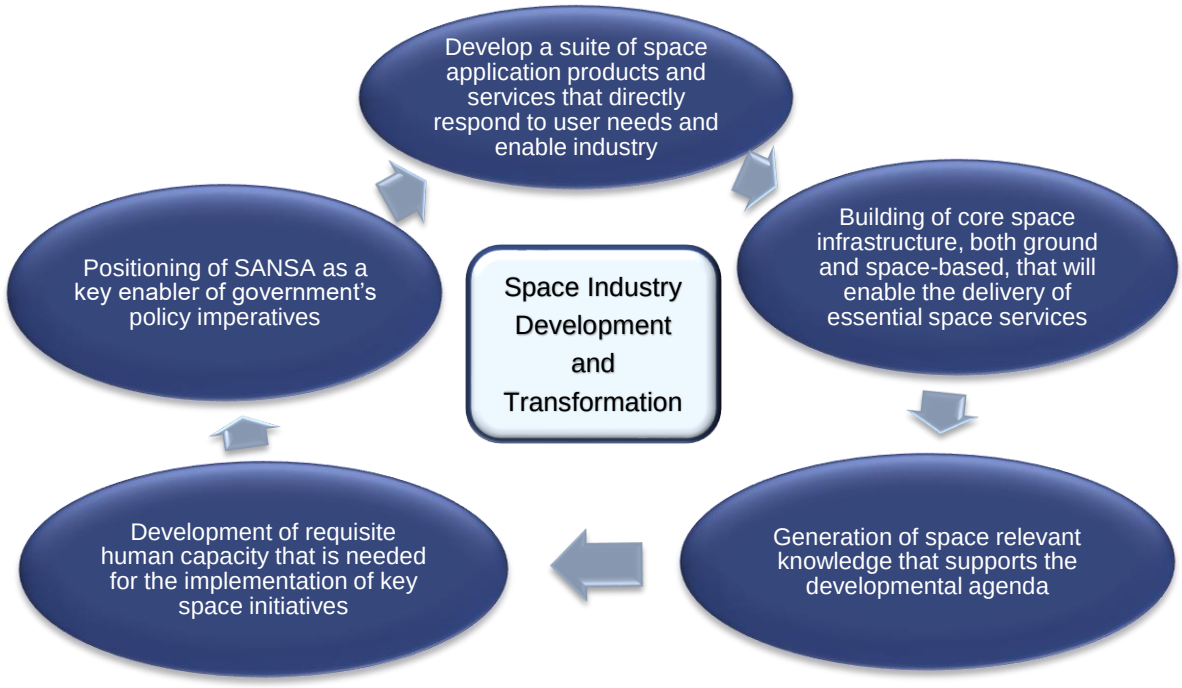
   b) SANSA needs to re-evaluate its financial sustainability by considering other investment approaches and sources of funding that have not traditionally been explored by the Agency.

   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, provide 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:

Figure 2: 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, amongst others:

a) Human capital development – prioritisation of historically disadvantage 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.

e) Adoption of the Fourth Industrial Revolution and big data in the space value chain.

PART C: MEASURING OUR PERFORMANCE

1. INSTITUTIONAL PERFORMANCE INFORMATION

SANSA seeks to ensure the rollout of its core programmes during the current MTSF cycle in a manner that leads to the achievement of strategic outcomes that collectively contribute to the realisation of the intended impact on the national space sector.

1.1. MEASURING THE IMPACT

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

Key enablers:

- Development of a fit-for-purpose and performance-driven organisation; and
- Leveraging on strategic partnerships to mobilise resources.

1.2. MEASURING THE OUTCOMES

Table 13: SANSA strategic outcomes, outcome indicators and five-year targets

OUTCOME	OUTCOME INDICATOR	BASELINE	FIVE-YEAR TARGET (MARCH 2025)
MTSF 2019-2024: Priority 2 – Economic transformation and job creation			
Outcome 1: **Increased space-relevant knowledge that supports the developmental agenda**	O1.1. Average research publication rate for South African researchers in direct space-related areas	New outcome indicator	Average annual research publication rate of 3 for South African researchers in direct space-related areas
MTSF 2019-2024: Priority 2 – Economic transformation and job creation			
Outcome 2: **Growth of the space sector through SANSA space-related industry expenditure**	O2.1. Average operational expenditure spend on SMEs *(TID – limited to local contracts, exclude foreign*	New indicator	Lower target: 20% Desired target: 30% Upper target: 40%

OUTCOME	OUTCOME INDICATOR	BASELINE	FIVE-YEAR TARGET (MARCH 2025)
(Applicable for 2021/22 FY) Revised for 2022/23 to 2024/25 planning period, as follows: **Stimulated and growing, inclusive space sector**	*contracts after exhausting local market)*		
MTSF 2019-2024: Priority 3 – Education, Skills and Health			
Outcome 3: **Increased human capacity for the implementation of key space initiatives**	O3.1. Percentage of graduated students to registered students in postgraduate space-related fields nationally	New indicator	Up to 20% of all registered (in space-related fields) postgraduate students graduate with space-related degrees
	O3.2. Percentage students and interns mentored by SANSA absorbed by the formal labour market	New indicator	Up to 50% of all students and interns mentored by SANSA absorbed by the formal labour market
MTSF 2019-2024: Priority 1 – A capable, ethical, and developmental State			
Outcome 4: **SANSA repositioned as a key enabler of government's space-related policies** (Applicable for 2021/22 FY) Revised for 2022/23 to 2024/25 planning period, as follows: **SANSA positioned as a key enabler for the implementation of government's space-related policies**	O4.1. Percentage of government departments and public entities that are using space products and services	42% of government departments and public entities that are using space products and services	80% of government departments and public entities that are using space products and services
	O4.2. External audit outcome	Unqualified audit opinion with material findings	Achieve and maintain an unqualified audit opinion with no material findings
MTSF 2019-2024: Priority 2 – Economic transformation and job creation			

OUTCOME	OUTCOME INDICATOR	BASELINE	FIVE-YEAR TARGET (MARCH 2025)
Outcome 5: **Appropriate infrastructure developed to support the local space sector** (Applicable for 2021/22 FY) Revised for 2022/23 to 2024/25 planning period, as follows: **Enabling infrastructure developed and upgraded to support the space sector value chain**	O5.1. Percentage growth in the Rand value of the national infrastructure asset base *(TID – limit to SANSA's asset base for this SP – in future will expand to full industry)*	R473.7 million value of the national infrastructure asset base	Lower target: 25% Upper target: 50%
MTSF 2019-2024: Priority 7 – A better Africa and World / Priority 2 – Economic transformation and job creation			
Outcome 6: **Increased share of the global space operations market** (Applicable for 2021/22 FY) Revised for 2022/23 to 2024/25 planning period, as follows: **Increased participation of the national space programme in the regional and global space market**	O6.1. Percentage growth in revenue generated from space products and applications	R405m from Space Operations (based on the previous five-year term)	Lower Target: 5% (primarily through space operations) Upper Target: 8% (Including potential new revenue streams from products and applications to be developed once the market analysis has been completed)
	O6.2. Percentage growth in products and services provided to the market	New indicator	Lower target: 20% Upper target: 40%

1.3. EXPLANATION OF PLANNED PERFORMANCE OVER THE FIVE-YEAR PLANNING PERIOD

1.3.1. CONTRIBUTION TO MTSF 2019-2024, DSI 2020-2025 STRATEGIC OUTCOMES AND THE OUTCOME'S CONTRIBUTION TO THE INTENDED IMPACT

While SANSA contributes to indirectly to all seven of the MTSF 2019-2024 priorities, the most direct contribution is to the priorities reflected in the following table. The table also reflects the outcomes' contribution to the intended impact of this strategic plan.

Table 14: Relating SANSA strategic outcomes and interventions to the MTSF, DSI outcomes and the intended impact

MTSF PRIORITIES	RELEVANT MTSF INTERVENTIONS	DSI STRATEGIC OUTCOMES	SANSA OUTCOME AND TARGETS	KEY INTERVENTIONS	CONTRIBUTION TO IMPACT
Priority 1: A capable, ethical, and developmental State	**Contributory role:** ▪ Prevent and fight corruption ▪ Modernise business processes ▪ Improve financial management ▪ Eliminate wasteful, fruitless, and irregular expenditure ▪ Implement the district development model ▪ Informed and empowered citizenry ▪ Mainstreaming women, youth, and people with disabilities (WYPWDs) ▪ Strategic plans to include priorities related to WYPWDs	Innovation in support of a capable and developmental State	**Outcome 4*:** SANSA positioned as a key enabler for the implementation of government's space-related policies: ▪ Increase the percentage of government departments and public entities that are using space products and services from 42% to 80% ▪ Achieve and maintain an unqualified audit opinion with no material matters	▪ Implement change initiatives to transform SANSA into a high-performing Agency ▪ Implement audit recommendations ▪ Build the reputation of SANSA through improved customer satisfaction and brand awareness ▪ Build and maintain strategic partnerships at local, African, and international level	▪ Fulfilment of SANSA mandate ▪ Socio-economic environmental challenges are addressed in a rational and sustainable manner ▪ SANSA is a recognised brand name ▪ Increased market share of the global space applications market
Priority 2: Economic transformation and job creation	▪ Skills priority plan developed (led by DHET and supported by DSI, with inputs from public entities) ▪ Increased investment in gross expenditure on R&D ▪ Commercialisation of public sector funded IP ▪ Jobs created through various interventions ▪ Youth in NEET absorbed in employment ▪ SMME development	Increased knowledge generation and research output	**Outcome 1:** Increased space-relevant knowledge that supports the developmental agenda: ▪ Benchmark and achieve an average research publication rate of 3 for South African researchers in direct space-related areas	National research and development output in space-related sciences: ▪ The national research productivity score for space supported R&D	▪ Increased access to global research opportunities that promotes the national capability and expertise ▪ Socio-economic priorities are achieved in a cost-effective and sustainable manner ▪ The value proposition of space is appreciated by all South Africans ▪ Evidence-based policy making and enabled decision-making

MTSF PRIORITIES	RELEVANT MTSF INTERVENTIONS	DSI STRATEGIC OUTCOMES	SANSA OUTCOME AND TARGETS	KEY INTERVENTIONS	CONTRIBUTION TO IMPACT
	▪ Increased infrastructure investment (fund) ▪ Preferential procurement: 40% women, 30% youth, 7% PWDs	A transformed, inclusive, responsive, and coherent NSI	**Outcome 2:** Stimulated and growing, inclusive space sector: ▪ 30% average operational expenditure spend on SMEs ▪	▪ Preferential procurement aimed at SMEs, disaggregated to WYPWDs ▪ SANSA space-related expenditure ▪ Industry exposure, leadership, and advocacy ▪ Deal making and opportunities facilitation ▪	Growth of the industry with sustainable SMEs, created through active participation in the space industry procurement and development
		Knowledge utilisation for economic development	**Outcome 5:** Enabling infrastructure developed and upgraded to support the space sector value chain: ▪ Percentage growth in the Rand value of the national infrastructure asset base – upper target, 50% / lower target, 25%	Infrastructure developed or upgraded, including: ▪ Digital Earth South Africa ▪ Operational Space Weather Centre ▪ Upgraded AIT Facility ▪ SIH development ▪ Deep space capabilities	▪ Comprehensive space infrastructure as an enabler of the space sector value chain ▪ Infrastructure positioned as a national platform that is part of a global space network ▪ Recognition as a leader in space technology and a preferred partner on the African continent.
Priority 2: Economic transformation and job creation and **Priority 7:** A better Africa and World	In addition to the above MTSF Priority 2 interventions, Outcome 6 contributes to the following Priority 7 interventions: ▪ Source investment into the South African economy for identified sectors ▪ Increased exports ▪ Preferred tourist destination	Knowledge utilisation for economic development	**Outcome 6:** Increased participation of the national space programme in the regional and global space market: ▪ Percentage growth in revenue generated space products and applications: Upper	▪ Development of operational space products and services that respond to market needs ▪ Revenue generated from space products and services	▪ The space sector as a significant contributor to the knowledge-based economy ▪ Regional integration and increased FDI ▪ Space-induced tourism

MTSF PRIORITIES	RELEVANT MTSF INTERVENTIONS	DSI STRATEGIC OUTCOMES	SANSA OUTCOME AND TARGETS	KEY INTERVENTIONS	CONTRIBUTION TO IMPACT
	▪ Growth of intra-Africa trade and leverage the African Continental Free Trade Agreement (AfCFTA)		target, 8% / Lower target, 5% ▪ Percentage growth in products and services provided to the market: Lower target: 20%, Upper target: 40%	▪ Leverage international partnerships	
Priority 3: Education, skills, and health	▪ IP awareness at technical and vocational education and training colleges ▪ Placing of graduates and students in DSI-funded work ▪ Grants provided to emerging researchers to improve the percentage of PhDs qualified staff ▪ PhD and pipeline postgraduate students awarded bursaries ▪ People reached through outreach, awareness, and training programmes in space science	Human capabilities and skills for the economy and for development	**Outcome 3:** Increased human capacity for the implementation of key space initiatives: ▪ Up to 20% of all registered (in space-related fields) postgraduate students graduate with space-related degrees ▪ Up to 50% of all students and interns mentored by SANSA absorbed by the formal labour market	▪ Youth engaged on awareness of space-related sciences ▪ Students and interns supported for formalised training ▪ Bursaries and scholarships provided for postgraduate studies in niche areas	▪ A skilled workforce that can effectively contribute to the knowledge economy ▪ Increased public support for space enabled applications and platforms ▪ Reduction in youth unemployment

** The Revised 2022/23 – 2024/25 outcome statement is reflected in the above table, refer to Part C, Section 1.2 for the 2021/22 framing of the outcome.*

1.3.2. ENABLERS TO ASSIST WITH ACHIEVING THE FIVE-YEAR TARGETS

Outcome 1

Five-year outcome indicator target:

To achieve an average research publication rate of 3 for South African researchers in direct space-related areas.

Key intervention:

Increase the national space research output by investing in the creation of new knowledge in support of fundamental and applied research outputs that could be used for the development of new knowledge, new technology platforms and for new products and services.

Key enablers:

1) Develop and implement a clear national space R&D plan.
2) Promote, monitor, and report on the research production rate of South African researchers in space-related areas.
3) Lead the national space R&D plan with high impact relevant research outputs.
4) Provide national space R&D infrastructure platforms (observational networks, data centres, facilities).
5) Conduct collaborative R&D with science councils, universities, and industry.
6) Ensure that there is synergy between research and applications.
7) Support national R&D through funding, supervision, and collaborative partnerships.
8) Foster international partnerships and facilitate national access to multinational projects.
9) Provide national seed funding that will unlock matching national and international funding.

Priorities related to women, youth, and people with disabilities (per SANSA B-BBEE Strategy):

1) Funding and supervision support will be provided to researchers from the designated groups.

The **implementation approach** will entail the identification of required applications and national policy and strategy requirements. This will be done in collaboration with the user community and applications development community. SANSA will serve as the lead entity to solicit and interpret user needs and translate them into technical requirements or specifications. Collaborative teams will be constituted to develop the applications based on the technical requirements. Where appropriate, calls for proposals for applications development will be made and awarded competitively. SANSA will also provide a solution-driven approach to the utilisation of space know-how and facilities for the benefit of national government and industry.

SANSA will provide the necessary support for space-related R&D. While SANSA researchers are encouraged and expected to conduct and lead research, increased output and impact can only be achieved by adopting and enforcing a more national collaborative approach. SANSA's primary focus should be on creating a research platform that facilitates national research and development. SANSA should, therefore, provide the necessary research infrastructure as well as leadership in space environment research. This will include developing and maintaining an extensive observational network, providing data resources and access to research facilities, and acting as the centre for research.

Outcome 2: Growth of the space sector through SANSA space-related industry expenditure (applicable for financial year 2021/22)

Revised Outcome 2: Stimulated and growing, inclusive space sector (applicable for financial years 2022/23-2024/25)

Five-year outcome indicator targets:

1) To achieve an average 30% (20% - 40% range) operational expenditure spend on SMEs.

Key interventions:

1) Contracting the sector, with a focus on SMEs, for upstream and downstream activities.

2) To promote the growth of the space sector and the creation and maintenance of high-level engineering skills by investing capital in South Africa's space industry.

3) Collaborate with industry to monitor and report on sector opportunities secured, both financial and non-financial (business development, capacitation, and market access).

4) Industry promotion, leadership, and advocacy to support industry sustainability and transformation.

Key enablers:

1) Provide equitable opportunities for the space sector through an open competitive process in the downstream segment and appropriate acquisition management strategies in the upstream segment.

2) SANSA SCM policy and processes to enable the allocated spend of the available parliamentary grant to SMEs.

3) Create platforms for the South African space industry to connect locally and internationally.

4) Provide exposure to the industry through deal making and opportunities facilitation.

5) Provide support to SMEs for the maintenance of SANSA infrastructure.

Priority related to women, youth, and people with disabilities (per SANSA B-BBEE Strategy):

Disaggregate the monitoring of opportunities secured and ensure preferential procurement to SMEs is in line with the MTSF 2019 -2024 targets for WYPWDs.

Outcome 3

Five-year outcome indicator targets:

1) Up to 20% of all registered (in space-related fields) postgraduate students graduate with space-related degrees.

2) Up to 50% of all students and interns mentored by SANSA employed by the formal labour market

Key interventions:

1) Implementation of a robust human capital development programme to build the requisite pipeline of expertise for absorption by the formal labour market.

2) Contribute to the development by DHET/DSI of a Sector Skills Development Strategy.

Key enablers (student and intern training):

1) Provide postgraduate student research support (funding, supervision, data, research facilities) to students.

2) Provision of bursaries and scholarships for postgraduate studies in niche areas.

3) Conduct short course training at universities and SANSA facilities.

4) Ensure that SANSA researchers co-supervise research students.

5) Partner with national and international universities.

6) Run internship programmes and workplace training initiatives.

7) Exploit the relationship between DSI and DHET to expand student infrastructure and programmes.

8) Ensure that the above is underpinned by the transformation agenda.

The **implementation approach** will include using SANSA facilities to expose young people to science. To this end, partnering with the SAASTA and national science centres will be crucial. SANSA will provide research support which is to include funding, supervision, data, and research facilities for training students.

SANSA will also conduct short course training and the Agency's researchers will co-supervise research students. As SANSA is not a registered academic institution, student training will always be done in partnership with national and international universities. Internship programmes and workplace training initiatives are to remain as crucial components of skills development.

To foster strategic partnerships and implement changes that will allow us to respond to national and continental developmental agendas SANSA will pursue the following activities:

Key enablers (youth awareness of science):

1) Attract, develop, and grow the national space science and technology skills base.

2) Develop, maintain, and market space science and technology related platforms to deliver appropriate science engagement programmes.

3) Use SANSA facilities to expose young people to science.

4) Have a focused science engagement programme at each facility with dedicated personnel to drive the initiative.

5) Partner with the South African Agency for Science and Technology Advancement (SAASTA) and national science centres.

Outcome 4: SANSA repositioned as a key enabler of government's space-related policies (applicable for financial year 2021/22)

Revised Outcome 4: SANSA positioned as a key enabler for the implementation of government's space-related policies (applicable for financial years 2022/23-2024/25)

Five-year outcome indicator targets:

1) To progress from 42% to 80% of government departments and public entities that are using space products and services.

2) To achieve and maintain an unqualified audit opinion with no material findings.

Key interventions:

1) Respond to the needs of end users by adopting a user-needs approach for all initiated activities and programmes.

2) Appropriate marketing and business development interventions need to be pursued to optimise the uptake of products and services emanating from the sector – at a national and continental level, to support evidence-based policy making.

3) Successful rollout of infrastructure developments and upgrades.

4) Position infrastructure as part of a global space network through international partnerships.

Key enablers (leverage a significant benefit for the space programme through global partnerships):

1) Develop a clear partnership strategy and enter formal strategic partnerships aligned with the partnership strategy.
2) Involve national partners in SANSA's strategic interagency partnerships and multinational proposals.
3) Actively participate in multinational forums.
4) Enter into long-term funding agreements with partners.
5) Develop and implement a cost-benefit framework for partnerships (this is to be used to quantify partnership value).
6) Ensure monitoring and reporting of all partnership engagements.

Key enablers (develop and implement high-performance initiatives and change elements):

1) Address the findings of the Audit Action Plan to achieve and maintain a clean audit outcome.
2) Develop and implement a clear marketing strategy for the South African space sector.
3) Optimise the use of space products and services by government and industry.
4) Provide training to increase the demand of space-based products and services.
5) Improve the visibility and branding of the South African space sector.
6) Communicate and publicise the service offering of the South African space sector.
7) Implement initiatives to transform SANSA into a high-performing agency, including a revised business model, review of SANSA values and culture development, performance management system and ICT architecture.

Priorities related to women, youth, and people with disabilities (per SANSA B-BBEE Strategy):

1) Advance SANSA's employment equity profile to align with the proposed sector targets set by the Department of labour.
2) Strive towards the achievement of the MTSF 2019-2024 preferential procurement targets, set at 40% for women, 30% for youth and 7% for people with disabilities.

The **implementation approach** will require SANSA to be more strategic in entering into partnerships. These should be informed by mutual benefit and a clear strategic rationale for the partnership. SANSA will use its partnerships to involve national partners in global projects. SANSA will also aim to become the hub for space partnerships, as the repository and conduit for international opportunities, and to facilitate national and international engagements. SANSA will facilitate these partnerships to ensure economies of scale and cost sharing benefits and to address any capacity gaps the national space sector may have.

A concerted marketing drive will form the mainstay of SANSA's and the South African space sector's long-term sustainability. SANSA will quantify the equivalent value leveraged through its strategic partnerships that will not always involve direct financial transactions, but will include non-transactional partner matching funds, equivalent/estimated expenditure if SANSA has to pay for the associated benefit and direct transactional project funding, among others. The business development focus is to ensure the maximum number of government departments using space-based products and services emanating from the space sector, including the provision of training courses to increase the uptake.

Outcome 5: Appropriate infrastructure developed to support the local space sector (applicable for financial year 2021/22)

Revised Outcome 5: Enabling infrastructure developed and upgraded to support the space sector value chain (applicable for financial years 2022/23-2024/25)

Five-year outcome indicator target:

Percentage growth in the Rand value of the national infrastructure asset base by between 25% (lower target) and 50% (upper target).

Key interventions:

1) Successful rollout of infrastructure developed to support the growth of the sector, to meet the needs of the end user and to support the developmental agenda.

2) Each infrastructure development must include a business case and revenue generation model.

3) Implementation of the SIH.

Key enablers (Successful launch and operations of missions):

1) Develop the country's space industrial capability.

2) Develop competitive space technologies.

3) Provide leadership to implement a domestic space engineering programme with clear performance measures.

4) Develop South African satellites and the local space industry in accordance with the funding allocations.

Key enablers (Development or upgrade of infrastructure):

1) Develop the country's operational capability.

2) Position the core capabilities for use by the broader industry.

3) Use the infrastructure to strengthen the space sector's research, development, and innovation initiatives.

4) Promote the long-term sustainability of the local space sector.

5) Game changer: Completion of the business case for the Space Infrastructure Hub (SIH) and to ensure successful implementation once the funding/partnership agreements have been approved.

Priorities related to women, youth, and people with disabilities (per SANSA B-BBEE Strategy):

1) A minimum of 30% allocation of the budget for infrastructure development and maintenance to be directed at SMEs and disaggregated in terms of the MTSF 2019-2024 targets to women, youth, and people with disabilities.

2) Provide opportunities for apprenticeships/learnerships in TVET trade-related fields (for maintenance of SANSA facilities).

The **implementation approach** requires SANSA to provide system engineering oversight for CubeSat missions. SANSA will contract with a prime contractor to provide oversight for the design, development, and manufacture of the satellite segments, but with a significant proportion subcontracted to the local space industry to ensure effective stimulation of the local industry. SANSA will also ensure that any IP developed through the CubeSat projects will be available for use by the broader space industry.

SANSA will also focus on developing and strengthening the operational infrastructure and facilities that will support the long-term sustainability of the broader space sector. These developments will also ensure an expanded focus of SANSA from its current mode of operations. Many of these developments will be unique on the continent and will be positioned as such within the broader African Space Programme.

The Space Infrastructure Hub is a vehicle for SANSA to develop satellites for Earth observation and various space missions, build a new ground station, develop an expanded data segment, and build a new data visualisation centre, activate the satellite-based augmentation system over southern Africa, and develop human capital.

The SIH has a project value of R4.47 billion and has been identified through the Sustainable Infrastructure Development Symposium (SIDS) as one of the top five most promising projects,

falling within the Digital Infrastructure category. It is a significant opportunity to build on indigenous space capability to service the needs of the country.

Upon completion of the business case and once the funding becomes available, it will be delivered in a phased approach, with Phase-1 focusing on consolidating capability and building credibility. The first phase will be delivered over a period of three years. It will have major implications for SANSA and provide the much-needed revenue injection to execute SANSA's mandate.

Outcome 6: Increased share of the global space operations market (applicable for financial year 2021/22)

Revised Outcome 6: Increased participation of the national space programme in the regional and global space market (applicable for financial years 2022/23-2024/25)

Five-year outcome indicator targets:

1) Percentage growth in revenue generated from space products and applications by between 5% (lower target) and 8% (upper target).

2) Percentage growth in products and services provided to the market – lower target: 20%, upper target: 40%.

Key interventions:

1) Lead and facilitate the creation of new products and applications for increased share of the space products and applications market.

2) Additional external revenue generated, supporting the sustainability of SANSA.

Key enablers (lead and facilitate the creation of products and applications):

1) Identify and work closely with government departments that have an impact on societies.

2) Continually assess user needs by engaging service providers (including government) and private sector users.

3) Continually scan the global landscape for new applications that meet societal needs.

4) Work with public service providers to translate their needs into technical requirements for developers who develop the necessary operational applications.

5) Identify unique space-based products and services to enhance the South African non-space industry.

6) Utilise space know-how and facilities to provide technology solutions for the space and non-space industries.

7) Collaborate with science councils, higher education institutions, and industry to develop operational applications.

8) Ensure that there is synergy between the R&D agenda and the applications.

9) Fund applications development projects.

10) Set and monitor the delivery standards of space-related applications.

11) Continually monitor the impact of the applications.

Key enablers (generate greater benefit for the space programme through space operation activities):

1) Support EO data acquisition.

2) Increase the in-orbit-testing business.

Priorities related to women, youth, and people with disabilities (per SANSA B-BBEE Strategy):

1) Support new entrants into the industry.

2) Ensure that a significant component of SANSA work (in terms of monetary value) is outsourced to SMEs in the space industry (both public and private).

The **implementation approach** requires SANSA to be the anchor client for the space industry through a sustained South African Space Programme. SANSA will also seek to create an environment that is conducive to and stimulates the local space industry. SANSA's partnerships will be used to strategically position the South African industry within open foreign markets, particularly those on the African continent and in emerging countries. SANSA will also focus on the data value-adding industries and space engineering sectors.

Attracting private investors for mature technologies and innovations will be critical for the sustainability of the programme. SANSA will also expand the space operation services and attract foreign direct investment.

The Innovation Hub's facilities and initiatives will also be crucial in the business incubation of space SMEs, as well as their professional development and exposure to venture capital. SANSA will work closely with state-owned enterprises with large infrastructure procurement programmes to leverage some of their off-set initiatives.

1.3.3. IMPLEMENTATION OF THE PLANNED PERFORMANCE

In pursuing these identified Outcomes and Strategic Priorities, SANSA will deliver in four thematic areas that are identified as important for an effective space programme. These thematic areas include:

1) **Earth observation:** We will continue to increase our knowledge and expertise in the development of space applications products and services to address our socio-economic environmental challenges.

2) **Navigation and positioning:** We will focus on the development of augmentation technologies, applications and services in navigation, timing, and positioning, including the development of know-how in the means to protect and improve these applications.

3) **Communication:** – We will focus on the development of telecommunications technologies and applications in collaboration with end users.

4) **Space science and exploration:** We will foster and support knowledge generation (fundamental and applied research), as well as mission driven space science and exploration projects, which are of strategic interest to the region.

The expected focus for each of these thematic areas, as reflected in the Ten-year Innovation Plan that extended from 2008 to 2018, and which is still relevant is shown in Table below. These deliverables still form the bedrock and focus of the South African Space Programme.

Table 15: Expected deliverables for the four space thematic areas

Earth Observation	Satellite Communications
▪ Establish an Earth Observation Data Centre (EODC). ▪ Develop a platform to integrate satellite and in-situ data. ▪ Develop medium to high-resolution payloads. ▪ Establish centres of competence for optronics and synthetic aperture radar. ▪ Develop the African Resource and Environmental Management Constellation in partnership with other African countries. ▪ Consolidate the acquisition of space data for government.	▪ Develop technologies for low data rate payloads ▪ Develop technologies for applications in e-education, telemedicine and rural communication and disaster support ▪ Develop a geostationary (GEO) communications system. ▪ Launch a small GEO satellite.
Navigation and Positioning	**Space Exploration**
▪ Develop a navigation augmentation system – a Satellite-based Augmentation System (SBAS). ▪ Develop navigation applications to support user requirements.	▪ Grow the knowledge economy through space environment research, and applications development. ▪ Develop joint partnerships in space science payloads.

Earth Observation	Satellite Communications
▪ Develop space weather applications to enable the protection of navigation and positioning applications.	▪ Establish and support centres of excellence. ▪ Establish an operational space weather centre to enable and facilitate the protection of space and non-space assets and technologies.

Going forward and impressing on the need to deliver on government priorities in a cost-effective and efficient manner, SANSA needs to prioritise the development and strengthening of the local space value chain, as opposed to severally developing and strengthening the four thematic areas. Specifically, the different functions of the respective programmes must be integrated to allow for value creation by helping to drive down costs and increasing the perception of value through differentiation. The notion of a space value chain refers to the idea that SANSA-led activities comprise of a chain of activities for transforming inputs into outputs that end users would value; and thus, achieve the intended outcomes and impacts.

The value chain process of transforming inputs into outputs is composed of several primary and support activities. The primary activities relate to the design, creation, and delivery of products and services, as well as its marketing and post-delivery service.

The support activities of the value chain provide administrative and technical support that allow the primary activities to take place. Critically important to interfacing between the primary activities is the cross-functional interfacing needed to achieve enhanced efficiency, quality, innovation, and responsiveness to user needs.

Figure 3: Space value chain

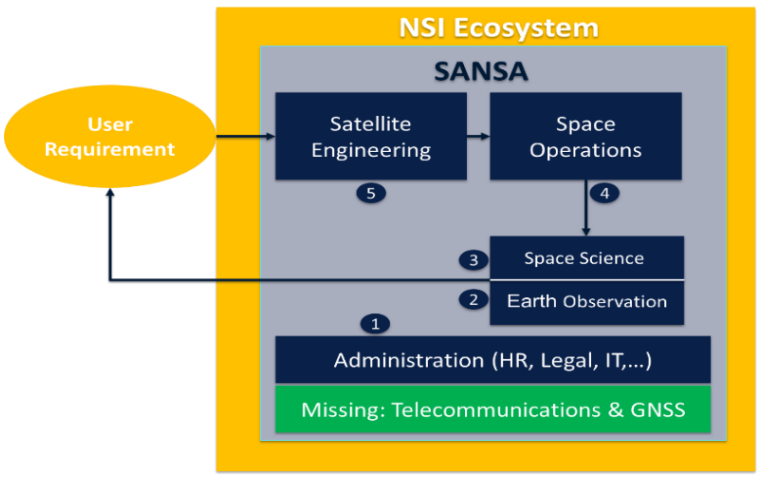


Figure 3 shows the space value chain of SANSA embedded in the local space sector, which comprise of the following key elements:

1) **Users:** The value proposition of the South African Space Programme is determined by how well the requirements of users are met.

2) **NSI ecosystem:** Comprise of public, private and NGO institutions that are involved in either the development of space products and services or the use of such offerings for decision-making purposes.

Primary activities, as per the various SANSA programmes, ordered along the space value chain include:

1) **SANSA Space Engineering [SE] Programme:** The Space Engineering Programme (Programme 5) provides systems engineering and project management expertise and drives a satellite build programme in South Africa in partnership with primary contractors, R&D institutions, and private sector partners. The programme conducts satellite and subsystems analysis, leads the technical side of space programme project management, supports human capital development in space engineering and facilitates private space industry partnerships.

2) **SANSA Space Operations [SO] Programme:** The Space Operations Programme (Programme 4) 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 national and international space industry clients and governments.

3) **SANSA Space Science [SS] Programme:** The Space Science Programme (Programme 3) leads multidisciplinary space science research and applications. Key functions include fundamental and applied space science research, the support of space facilitated science through data acquisition, the coordination and administration of scientific data, and the provision of space weather and magnetic technology products and services on a commercial and private basis. The programme also provides leadership in postgraduate student training, as well as providing science engagement, public engagement, and learner and educator support with STEM subjects.

4) **SANSA Earth Observation [EO] Programme:** The Earth Observation Programme (Programme 2) is responsible for the collection, processing, archiving and distribution of Earth observation data, value-added data products and services for societal benefit. SANSA maintains an Earth observation portfolio of sensors, provides an R&D platform, conducts satellite image processing and correction, and supports human capital development and science engagement in Earth observation that will be positioned for uptake in South Africa through the SAEOS initiative and in Africa through the AfriGEO initiative.

5) Support activities for facilitating the primary activities are through the Administrative Programme:

   SANSA Administration Programme: The Administration Programme (Programme 1) provides management, administrative and technical support across all operating units. This facilitates operational efficiency and cost-effective management, aligned with sound governance principles and the seamless integration and collaboration between SANSA programmes.

6) There are currently two thematic focus areas that are missing from SANSA's portfolio of activities, namely, satellite telecommunications and GNSS. This Strategic Plan attempts to establish programmes related to these thematic focus areas within SANSA and falls under SANSA's aspirations.

Figure 4: SANSA's organisational structure

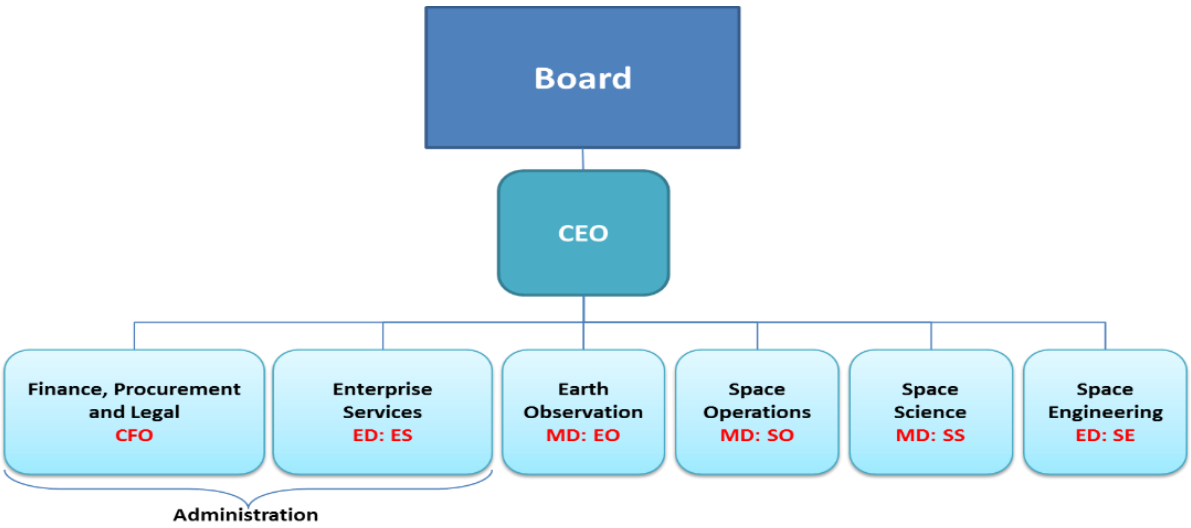


Table 16: Contribution of SANSA programmes to the strategic priorities

STRATEGIC PRIORITIES	PROGRAMMES				
	Administration	Earth Observation	Space Science	Space Operations	Space Engineering
The development of a suite of space application products and services that respond to user needs and enable industry	✓	✓	✓		
The building of core space infrastructure, both ground and space-based, that will enable the delivery of essential space services	✓	✓	✓	✓	✓
The generation of space relevant knowledge that supports the developmental agenda	✓	✓	✓		✓
The development of requisite human capacity that is needed for implementation of key space initiatives	✓	✓	✓	✓	✓
The positioning of SANSA as a key enabler of government's policy imperatives	✓	✓	✓	✓	✓
Industry development and transformation	✓	✓	✓	✓	✓

The organisational structure for SANSA is shown in Figure 4. Each of the programmes will operate along the space value chain and will work seamlessly in addressing the socio-economic environmental challenges it has been mandated to. Each of the programmes contribute in varying degrees to the organisational Strategic Outcomes.

1.3.4. ASPIRATIONAL INITIATIVES

This Section presents an extended Plan for SANSA, which essentially reflects the additional activities, per the various programmes, that the organisation should take on subject to the appropriate levels of funding being committed or secured. These activities will be undertaken in partnership with the broader space sector but will also require a refinement of SANSA's roles and responsibilities in providing the appropriate leadership to the sector.

Table 17: Summary of Aspirational Initiatives

PROGRAMME	ASPIRATIONAL INITIATIVE	BRIEF DESCRIPTION	STRATEGIC ALIGNMENT
Earth Observation (EO)	Data and infrastructure.	▪ Collection, storage, archiving, processing, and dissemination of satellite imagery, development of fundamental data sets and coordinating the development of value-added products and services through the NSI. ▪ EODC, as part of the SAEOSS initiative, will be positioned as a central hub for Earth observation data archiving, storage and dissemination of data and information, and will be called Digital Earth South Africa (DESA).	SANSA products and services play a fundamental role in supporting policies and activities linked to food security, water resource management, human settlements mapping, disaster management, environmental monitoring, and climate change, etc.
	Development of national land use and land cover base datasets.	▪ Development of national base datasets, such as biophysical variables, water bodies, human settlements, vegetation layers and satellite mosaics, which are critical in supporting the Earth observation user community. ▪ SANSA researchers and experts will focus on the development and distribution of essential base products and services needed by end users, public and private sector entities to provide an enabling environment for other entities to further pursue business and development opportunities.	Aligned to SANSA's mandate of developing the local space industry.
	Coordination of the development of products and services.	▪ Coordinating the development of Earth observation products and services is critical for enabling SANSA to contribute to national priorities and strategies, such as the NDP, Nine-Point Plan, Operations Phakisa, NSS, SAEOS Strategy, Ten-Year Innovation Plan, and international imperatives, such as United Nations Sustainable Development Goals and the AU Agenda 2063. ▪ The development of these products and services on the national front will be extended for use on the African continent.	This initiative is in line with the new SANSA vision, given the development of the African Space Programme.

PROGRAMME	ASPIRATIONAL INITIATIVE	BRIEF DESCRIPTION	STRATEGIC ALIGNMENT
Space Science	Space environment	▪ The key contribution of this segment will be to the knowledge economy - involving fundamental and applied space science research in space weather, geomagnetism, ionospheric science, space climate studies, plasma physics, solar physics, heliophysics, and atmospheric physics. ▪ A 24/7 operational space weather centre will be maintained to provide a platform for products and services developed mostly for the defence, aviation, and energy sectors and primarily serving communications and navigation applications.	SANSA will aim to eventually launch a national space weather satellite in the long term. However, in the next five-year period the aim will be to place strategic in-situ experiments as scientific payloads on existing satellites.
	Space science over the southern oceans and polar regions	▪ The convergence of geomagnetic field lines at the polar regions makes Antarctica a window into the near-Earth space environment, providing excellent space weather data. ▪ SANSA's high-frequency (HF) radar located in Antarctica provides extensive opportunities for unique research, and international partnerships. The SuperDARN network provides SANSA with access to a global network of instruments.	In the long term it is proposed that a satellite ground station for polar orbiting satellites be installed in Antarctica (requisite investigative groundwork could be completed over a five-year period).
	Applied electromagnetic technology	▪ This segment allows for the provision of space and non-space applications from specialised capabilities afforded by the unique SANSA space science facilities in Hermanus. ▪ SANSA plays a very important role in advising users of the Commercial Off-The-Shelf (COTS) magnetometers in the use and acquisition of the magnetometers and magnetic sensors.	Space qualified magnetometry will be grown to accommodate satellite build support. More international customers will be sought, and the expertise/capability will be grown in this area.
	African instrumentation network	▪ Africa has a unique geographic advantage: a wide range of geographic latitudes are reached in one continent and the magnetic dip equator passes through the middle of the continent ▪ There is vast potential for expanding the SANSA geophysical instrumentation network within South Africa and into Africa.	South Africa has a role to play in partnering within Africa, and SANSA could be positioned to lead a scientific effort in space science exploration on the continent.

PROGRAMME	ASPIRATIONAL INITIATIVE	BRIEF DESCRIPTION	STRATEGIC ALIGNMENT
Space Operations	Teleport services	▪ Teleports are the ground-based side of the global satellite network, and they provide terrestrial networks with access to satellite transponders in orbit - 36,200 km above the equator. ▪ The expansion into the teleport market will ensure that SANSA has capability and skills for any envisaged South African satellite build projects, thus catering for mission control, SBAS, data management, and many other satellite applications required for local and African communities.	The expansion of the space operations business into teleport services will help create a market entry into Africa, as these are essential services needed throughout the continent.
	Deep Space Network (DSN) hosting: Ground station at Matjiesfontein	▪ The current DSN is overloaded and NASA with other leading space agencies, are expanding DSNs whilst moving to new technologies as more planetary missions, such as those to Mars and beyond, are finalised. ▪ SANSA is currently in discussion with NASA to establish a DSN site in Matjiesfontein and SO has the advantage worldwide to build a new ground station in a very special location that could be suited for Deep Space activities, as well as CubeSAT tracking, training and selected teleport services.	This will strengthen South African ground station capabilities to be one of six nations with the capability to take part in the Global Deep Space activities.
	Telemetry, tracking and command (TT&C)	▪ The SANSA Space Operations facility is ideally positioned geographically as a TT&C centre for geo-synchronous, polar orbiting and scientific spacecrafts. ▪ The facility has over 52 years of experience in TT&C support, dating back to NASA and JPL in 1960, and continues with support from the French Space Agency (CNES), Boeing, Intelsat, other national space agencies, and aerospace companies. ▪ SANSA must continuously develop its infrastructure through maintenance and capital expansion to ensure continued service excellence in the global arena	TT&C services will be enhanced for future South African missions such as EO-Sat 1.
Space Engineering	Space missions	▪ Currently, the national priorities in terms of missions include optical and synthetic aperture radar (SAR) missions, which are vital for fulfilling user requirements of government. However, there is a need to phase in the	The focus of space missions is to identify key satellite missions over the next five years and to ensure the base

PROGRAMME	ASPIRATIONAL INITIATIVE	BRIEF DESCRIPTION	STRATEGIC ALIGNMENT
		development of a continuity mission that will ensure data continuity along the EO-Sat family of missions. ▪ This programme will define missions, which will include various payloads for different applications, and it is envisaged that through a systematic approach, satellites will be developed to meet the key areas of environmental resources management, health, safety and security and innovation and economic growth.	competencies and technologies are available to support various missions.
	Industry development	▪ SANSA will assume responsibility for the scoping, development, and implementation of an Industry Development Framework to be developed in consultation with the DSI, focusing on R&D led industry development, and the dtic, focusing on the localisation of mature technology platforms. ▪ SANSA will also use the Houwteq facility to develop new technologies in conjunction with industry and start-ups would be assisted by Houwteq-based engineers in the development process, thereby fulfilling the role of one of the space technology incubators.	The identification and development of technologies required to fulfil niche market opportunities will provide impetus to the South African space industry.
	Facility development	▪ Facilities are crucial for providing space solutions to government users and it is necessary for strategic facilities in the space value chain reside within SANSA. ▪ The issue of ownership of Houwteq within SANSA remains a priority to be addressed with Shareholder support as it will ensure that assembly, integration and testing (AIT) services are provided to the South African space, automotive, and defence industries, designed to incentivise the growth of those industries.	Identification of potential national and international clientele, the strategic requirement in terms of independence from other launch providers, and benefits for the country in terms of industry and economic development.

1.3.5. OTHER KEY STRATEGIC INITIATIVES

1) NAVIGATION AND POSITIONING

Navigation and positioning is a new area that SANSA is venturing into. Work has advanced, through international partnerships, for the development and testing of an operational SBAS, which has proven successful. The standard GPS is free of charge and nominally provides 5-10 meters accuracy, but it can be significantly worse in some cases. SBAS improves the accuracy to around 1 meter and is much more reliable. Critically, SBAS services are relatively inexpensive and many existing GPS receivers can already receive SBAS services.

These SBAS benefits are well-understood internationally and have led to the deployment of SBAS services in the US, Europe, Japan, and India. Countries/regions have moved to have independent SBAS services given their use for defence purposes and safety of life applications. It is therefore important that South Africa and the region adopt an independent SBAS to ensure independence and operational efficiencies.

a) Establish Open Service SBAS System

SANSA has completed several pre-cursor projects and studies around the business case and system requirements for SBAS. Most recently the SBAS-Africa has deployed a test-bed system. The preliminary SBAS business case has been produced in accordance with National Treasury's capital planning guidelines. Four options have been considered and the preferred option delivers R15.6 billion (discounted) to the South African economy over 25 years with a return on investment of better than 10:1. The proposed SBAS can also be extended to deliver major economic benefits to countries in the southern African region with further extension and integration into the rest of Africa.

To capitalise on the legacy of the SBAS–Africa project and thus save significantly on the cost of developing an SBAS system, some critical activities need to be completed. These include acquiring SBAS satellite access codes, acquiring the legacy elements from the SBAS–Africa project, developing a navigation payload strategy (NigComSat -1R has an available navigation payload, but consideration must be given to including such a payload on a future South African communications satellite), building institutional capacity, business, and market development, and confirming and demonstrating benefits to potential users of the services.

b) Establish GNSS Applications and Configurable User Terminal

SBAS-Africa positions this service to improve many market sectors (e.g., agriculture, aviation, geomatics, logistics and maritime) and to support policy delivery by stimulating innovation and growing industrial capacity, creating jobs, reducing inequality, improving safety, increasing productivity, and enhancing environmental sustainability. To verify the business case, medium term applications need to be launched. Some of these applications are already in place however it requires support (Post Office GNSS database, agriculture, mine safety application, Stats SA).

For the existing requirements and the development of other applications, the programme needs in house capacity that can assist the domain experts in integrating SBAS into their solutions. To further promote the use of SBAS in the user community, the development of a very low-cost terminal that is SBAS capable can be integrated into other systems

using standard protocols. This would use embedded electronics that can easily be made part of high-volume production of application hardware such as location-based system, i.e., vehicle tracking systems.

c) **International Coordination**

SBAS systems spans across regions and international coordination is of utmost importance. A southern African solution will also impact neighbouring systems, such as the European Geostationary Navigation Overlay Service (EGNOS) and GPS-aided GEO Augmented Navigation (GAGAN). In order not to interfere with these operational systems, RSA-SBAS needs to coordinate with these entities. South Africa also needs to acquire a PRN number for their system and SANSA will represent South Africa in the forums where these decisions are made.

The SBAS programme has ideals to operate beyond the borders and integrate with the implementation of the African Space Strategy. Coordination on subcontinental and continental level needs to be done as well.

2) **TELECOMMUNICATION**

The telecommunications satellite market is certainly the most mature space market in terms of generating commercial revenue. Given its inherent cost and capability advantages for supporting many global mobile services, satellite telecommunications have evolved into a core part of the global telecommunications marketplace. Satellite telecommunications systems have important features that fibre optics lack, namely, (i) mobility – mobile users cannot be connected to the fibre network directly, (ii) flexibility – once terrestrial infrastructure is built, it is extremely expensive to restructure it, (iii) rural and remote connections – it is still not cost effective to deploy high-capacity fibre networks in areas with low-density traffic and difficult topography, and (iv) broadcast capability – where point-to-multipoint connections are able to reach millions simultaneously in a cost-effective way.

Satellite communications is thus a key technology that could enable South Africa to participate in the build-up of the global information infrastructure. Satellite communication systems, featured by large ‘footprints’, ranging in size from a country to a continent, avoid the need for terrestrial infrastructure and shorten the time for establishing basic and advanced communications in rural areas. Most areas in developing countries are sparsely populated and highly rural such as the case in South Africa. Satellite communication is an excellent option for meeting this and many other pressing communications needs of developing economies. Access to information and communication infrastructure greatly enhances economic growth. When a reliable and affordable medium for information exchange is available, previously unanticipated developments ensue.

To cover the full value chain of activities for satellite communications, all SANSA programmes will be involved in the conceptual phase of a national satellite telecommunications programme. SANSA has a good understanding and capability in satellite communications, through services it renders in the international market. SANSA will use its capabilities to interpret the potential user requirements from a public goods perspective into technical requirements for a satellite telecommunication system for South Africa. SANSA through the DSI and DTPS will provide support on the user requirement, a focused system design and ground-based infrastructure. However, given that this is a new domain for SANSA from a national operational perspective, there is a need to build and strengthen the requisite capacity and capabilities by

establishing a programme that focuses on satellite telecommunications, including the development of the local industry.

a) **Telemetry, Tracking and Control**

SANSA, in line with the requirement of ensuring full national satellite communication ground support systems, will strengthen and complement its existing capabilities. SANSA will operate the gateway Earth station (teleport) for such a system under its recently adopted teleport strategy. The mission control of such a satellite will also be operated from SANSA. To this end SANSA will install the required systems at its ground station and operate it from its existing operations facilities. SANSA employees will be upskilled for this new activity.

A telecommunications satellite programme in South Africa will ensure that SANSA develops skills and knowledge to mission control and manage geo-stationary satellites. This would be a first, as South Africa has not endeavoured into this technology environment, although SANSA has performed such support services for international clients.

To fulfil such a requirement at the home front, SANSA will undertake the following actions:

i) Establish a new centre for the control of geo-stationary satellites.

ii) Establish a new dedicated antenna.

iii) Undertake training of employees abroad with partners who have such experience.

iv) Link fibre to the national backbone; and

v) Licence the necessary frequency bands for operations.

b) **Public Good Products and Services**

There are currently other public sector institutions that have an interest in satellite telecommunications, and these include (i) Sentech, which has a commercial interest and offers signal distribution services to most of the country's licensed broadcasters, (ii) State Information Technology Agency, which has a government focus and uses information technology to support the delivery of e-Government services to all its citizens. In terms of the SANSA mandate, the Agency should provide products and services for the broader public good that is not in competition with other public sector institutions. In this regard, SANSA will endeavour to develop and provide specific product and service offerings in partnership with other key institutions within the NSI.

Using telecommunications signal and other advanced technologies, we will be able to penetrate the sparsely populated and rural areas of our country and provide vital services that hitherto have been conceptualised, but not implemented. Basically, these services are taken to the people in the environment in which it is needed and not the other way around. Services that can easily be deployed through satellite telecommunications include:

i) Affordable broadband access to marginalised communities.

ii) e-Education with full bi-direction interactions.

iii) e-Medicine services to clinics and hospitals.

iv) Mobile clinics for point of care services.

v) Law enforcement requirements that require on-the-move communications access.

vi) Access to secure communications and networks to government departments.

vii) Post-disaster management and guaranteed access to communications.

viii) SBAS payload operations in support of GNSS strategy.

c) **Development of the Local Industry**

The South African position with regards to geostationary communications satellite is a little more challenging than that of either optical or SAR platforms. The primary question is whether South Africa should pursue this capability for communications satellites that will be built once every fifteen years on average. Unless dictated by market feasibility, some important policy decisions need to be made with respect to whether South Africa should pursue an indigenous industrial capability for communications satellites and there are three possible approaches for this platform:

i) Procure the full communications satellite from international vendors with a limited South African contribution.

ii) Procure a communications satellite with some South African technology or engineering options embedded into the platform, or

iii) Build a communications satellite, inclusive of SBAS payloads, through partnerships with other technologically advanced partners.

These approaches are not necessarily mutually exclusive, but dependent on where we are in terms of technology readiness levels and in the lifecycle stage of a telecommunications mission. Irrespective of the approach, there must be an element of local industry development and localisation of key technologies. In general, the pursuit of procuring (approaches 1 and 2 – phase 1) a communications satellite could have the net effect of migrating the relevant capability towards greater South African industrial self-sufficiency with the end effect of a local telecommunications satellite build (approach 3 – phase 2).

Another sector that the South African industry could become effective in is the design and manufacture of “end user” type products, such as:

i) Satellite dishes of the order of 1m.

ii) High-powered amplifiers.

iii) Block up/down converters.

South Africa has the sheet metal technology, as well as microwave and associated radio technologies that are required for satellite dishes and components, respectively. In addition, the CubeSat platform will be explored for low data rate communications and capture, store, and forward applications. These initiatives provide economic growth

potentials that require immediate up skilling of our labour force, and will result in improved factory conditions, such as clean environments that are a must for such technologies.

DELIVERY AT INSTITUTIONAL AND COMMUNITY LEVELS

The ownership of the government priorities resides across many national and provincial government departments and at the local district and municipality levels. To ensure that the implementation of these priorities is impacted at the correct level, SANSA will:

1) Work closely with the DSI in engaging other line departments (at national and provincial levels) so that our interventions have maximal impact to the priorities of these institutions.

2) Work according to the District Development Model, that has recently been adopted by government, to ensure maximal impact at the local district and municipality levels.

SANSA will also introduce several interventions (subject to funding) to assist in ensuring impact at the institutional and community levels through awareness and training interventions.

RESOURCE REQUIREMENTS

This Strategic Plan is intended to relook at the mandate of SANSA and thereby extract the key activities that SANSA should be implementing. SANSA is currently not implementing all the activities it should be due to budgetary constraints. This exercise has allowed SANSA to take a fresh look at its existing activities and make a realistic assessment of where it should be focusing in the next five years through the expansion of existing programmes and the identification of aspirational initiatives.

New areas of focus, i.e., GNSS and Satellite Communications have been earmarked for development in the national space sector and SANSA will work with the key government departments to support the policy processes that will support these new focus areas, which are deemed vital for South Africa. Expertise that is needed to support these focus areas will be developed internally within SANSA and in the broader space sector.

Although the funding for the National Space Programme is still constrained, this Plan provides a basis upon which new funding opportunities could be pursued in line with ensuring that SANSA's full mandate is achieved.

2. KEY RISKS AND MITIGATIONS

It is important for SANSA to recognise any risks that may impact delivery on this Strategic Plan and manage them appropriately. The ten key identified SANSA risks and their related mitigation actions are captured in Table 18 below:

Table 18: Key risks and mitigations

OUTCOMES	RISK DESCRIPTION	MITIGATION ACTIONS
Outcome 1	Significant decline in the generation and dissemination of new knowledge	▪ 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	▪ 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 & national stakeholders. ▪ SIH Implementation.
Outcome 3	Reduced ability to create awareness amongst the youth to maintain and/or grow a developmental pipeline	▪ Align Science engagement activities to contribute to district development model.
	Inability to absorb new and innovative skills generated through a "pipeline"	▪ 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	▪ 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.
Outcome 5	Limited competitiveness and ability to access new markets	▪ Mobilisation of additional resources (capitalisation) ▪ Formal annual request to NT to retain surplus

3. PUBLIC ENTITIES

The South African National Space Agency does not have any Public Entities.

PART D: TECHNICAL INDICATOR DESCRIPTIONS

1. OUTCOME 1: INCREASED SPACE-RELEVANT KNOWLEDGE THAT SUPPORTS THE DEVELOPMENTAL AGENDA

Indicator Title 1.1.	Average research publication rate for South African researchers in direct space-related areas
Definition	The average publication rate for South African researchers in direct space-related fields.
Source of data	Publication list of impact factor listed journal papers for space-related researchers in South Africa (space-related includes Space Physics, Space Engineering, Earth Observation). List of contributing active researchers in these areas.
Method of Calculation / Assessment	The number of peer reviewed impact factor journal publications produced in space-related fields divided by the number of contributing active researchers in these areas.
Assumptions	Information will be available from Universities and other databases.
Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Not applicable
Desired Performance	Average annual research publication rate of 3 for South African researchers in direct space-related areas.
Indicator Responsibility	MD: Space Science / MD: Earth Observation

2. OUTCOME 2: GROWTH OF THE SPACE SECTOR THROUGH SANSA SPACE-RELATED INDUSTRY EXPENDITURE

Above outcome is applicable for the 2021/22 financial year. Revised as follows for the 2022/23 to 2024/25 planning period:

Revised Outcome 2: Stimulated and growing, inclusive space sector

Indicator Title 2.1.	Average operational expenditure spend on SMEs
Definition	The indicator measures all operational expenditure (contracted and general), that is outsourced to **Small and Medium Enterprises (SMEs)** and overseen by SCM for all SANSA programmes including Administration / Corporate Office, Earth Observation, Space Science, Space Operations and Space Engineering. It includes expenditure related to all local contracts but excludes foreign contracts that prescribe procurement requirements.
Source of data	Internal contracts / purchase orders and related invoices for all expenditure (including core space projects), excluding foreign contracts.
Method of Calculation / Assessment	Rand value of invoices divided by the rand value of those invoices outsourced to SMEs.
Assumptions	Participation of targeted beneficiaries.
Disaggregation of Beneficiaries (where applicable)	While this may not be possible to achieve in the medium term, SANSA will strive towards achieving the MTSF 2019-2024 targets for designated groups: Women-owned SMEs – 40% Youth-owned SMEs – 30% PWD-owned SME – 7%
Spatial Transformation (where applicable)	Across South Africa.
Desired Performance	30% average over the planning period (desired target)
Indicator Responsibility	CFO, supported by ED: Space Engineering / MD: Earth Observation / MD: Space Science / MD: Space Operations / ED: Enterprise Services.

3. OUTCOME 3: INCREASED HUMAN CAPACITY FOR THE IMPLEMENTATION OF KEY SPACE INITIATIVES

Indicator Title 3.1.	Percentage of graduated students to registered students in postgraduate space-related fields nationally
Definition	A measure of the number of graduated students in postgraduate space-related fields nationally compared to the registrations. Provides an indication of the throughput of qualified individuals.
Source of data	1. University databases 2. Student admin files
Method of Calculation / Assessment	Annually track the graduated students and divide by the number of registered students in space-related areas.
Assumptions	Information on graduated students is readily available.
Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Not applicable
Desired Performance	Up to 20% of all registered (in space-related fields) postgraduate students graduate with space-related degrees
Indicator Responsibility	MD: Space Science / MD: Earth Observation

Indicator Title 3.2.	Percentage students and interns mentored by SANSA absorbed by the formal labour market
Definition	A measure of the absorption rate of SANSA mentored students and interns into the formal labour market (could be industry, government, academia, education, ICT, environment, etc.)
Source of data	Tracking tool of SANSA mentored students and interns Exit interviews with interns
Method of Calculation / Assessment	Annually determine the number of mentored students and interns who found employment in the formal labour market
Assumptions	Students and interns will remain in contact with SANSA

Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Not applicable
Desired Performance	Up to 50% of all students and interns mentored by SANSA employed by the formal labour market
Indicator Responsibility	MD: Space Science / MD: Earth Observation

4. OUTCOME 4: SANSA REPOSITIONED AS A KEY ENABLER OF GOVERNMENT'S SPACE-RELATED POLICIES

Above outcome is applicable for the 2021/22 financial year. Revised as follows for the 2022/23 to 2024/25 planning period:

Revised Outcome 4: SANSA Positioned as a key enabler for the implementation of government's space-related policies

Indicator Title 4.1.	Percentage of 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	Reports that document provision of data and value-add products to government and its entities, including appropriate statistics. This information may include some or all of the following: ▪ Stakeholder registry ▪ Data and product distribution stats ▪ Online access of data and products ▪ Industry contracts/agreement to deliver services/products ▪ Confirmed orders for services/products ▪ Report on use and impact
Method of Calculation / Assessment	A brief qualitative report of the organs of states that use 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.

Assumptions	Availability of space products and services that meet client needs.
Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Across South Africa.
Desired Performance	80% of government departments and public entities that are using space products and services
Indicator Responsibility	MD: Earth Observation

Indicator Title 4.2.	**External audit outcome**
Definition	The audit opinion of the independent external audit company on the annual external audit of financial statements, performance objectives and compliance with legislation (for the previous financial year).
Source of data	Final signed External Auditor's Report, reflecting the Audit Outcome.
Method of Calculation / Assessment	Audit Outcome for the previous financial year stated in the signed External Audit Report.
Assumptions	None
Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Not applicable
Desired Performance	Unqualified audit opinion with no material matters achieved in the 2022/23 financial year and maintained in each subsequent financial year of the planning period
Indicator Responsibility	CFO supported by All Executives

5. OUTCOME 5: APPROPRIATE INFRASTRUCTURE DEVELOPED TO SUPPORT THE LOCAL SPACE SECTOR

Above outcome is applicable for the 2021/22 financial year. Revised as follows for the 2022/23 to 2024/25 planning period:

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

Indicator Title 5.1.	Percentage growth in the Rand value of the national infrastructure asset base
Definition	Growth in the Rand value of SANSA's contribution to the national space infrastructure platform. This includes new infrastructure developed, as well as infrastructure that has been upgraded.
Source of data	SANSA Fixed Asset Register
Method of Calculation / Assessment	Annual Asset Acquisition and Upgraded value as a % of the asset database to determine the growth in the infrastructure asset base (at cost)
Assumptions	▪ The assumption is that all assets in the Fixed Asset Register are utilised for the development of the infrastructure to support the space sector value chain. ▪ SANSA's infrastructure asset base is the biggest contributor to the national space infrastructure asset base.
Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Not applicable
Desired Performance	Lower Target: 25% Upper Target: 50%
Indicator Responsibility	CFO supported by all Executives

6. OUTCOME 6: INCREASED SHARE OF THE GLOBAL SPACE OPERATIONS MARKET

Above outcome is applicable for the 2021/22 financial year. Revised as follows for the 2022/23 to 2024/25 planning period:

Revised Outcome 6: Increased participation of the national space programme in the regional and global space market

Indicator Title 6.1.	Percentage growth in revenue generated from space products and applications
Definition	The year-on-year income from the products and services delivered by the programmes The amount of new and longstanding services or products supplied to customers
Source of data	Financial statements of SANSA Product count from programmes
Method of Calculation / Assessment	Measuring the income out of projects, services and products delivered by SANSA as a whole Spreadsheet from programmes pertaining the products or services
Assumptions	None
Disaggregation of Beneficiaries (where applicable)	Not applicable
Spatial Transformation (where applicable)	Not applicable
Desired Performance	Lower Target: 5% (primarily through space operations) Upper Target: 8% (including potential new revenue streams from products and applications developed) Continuous growth above inflation year on year will be a good indicator
Indicator Responsibility	MD: Space Operations / ED: Space Engineering.

Indicator Title 6.2.	Percentage growth in products and services provided to the market
Definition	The number of new products and services supplied to customers
Source of data	Reports that document what has been achieved or produced including appropriate statistics for each product and service offered to the market, through current efforts and envisaged Space Infrastructure Hub operations within the following categories: **PS1 – Data as a Service** ▪ 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. **PS2 – Remote Sensing Products** ▪ Confirmed orders for services/products. ▪ Publication of base remote sensing and fundamental data products. ▪ Industry contracts/agreement to deliver services/product; and ▪ Report on use and impact. **PS3 – Infrastructure (Platforms) as a Service** ▪ Use cases built on Digital Earth South Africa (DESA). ▪ User registry of DESA; and ▪ Report on use and impact. **PS4 – Magnetic Technology Services** ▪ Calibration Services Sheets; and ▪ Report on uptake, use and impact. **PS5 - Space Weather Services** ▪ Client Progress Reports, if applicable; and ▪ Report detailing uptake, use and impact. **PS6 - Space Operation Products and Applications** ▪ Progress reports on products / services to clients in the local and global space community; and ▪ Report on use and impact. **PS7 – Space Engineering Services (AIT and CDF)** ▪ 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 may also reflect how the impactful product/service was determined for this indicator. A new product for example under Data as a Service, could be a newly processed data level, e.g., Level 1 to ARD or a new sensor added in the portfolio e.g., Landsat 9.
Assumptions	Internal capacity. Based on the co-creation principle set for SIH, SANSA envisages to contract industry to develop some of the products and services.
Disaggregation of Beneficiaries	Not applicable.
Spatial Transformation	Not applicable.

Desired Performance	Lower target: 20% growth rate Upper target: 40% growth rate
Indicator Responsibility	MD: Earth Observation / MD: Space Science / MD: Space Operations; ED: Space Engineering.

ANNEXURES TO THE STRATEGIC PLAN

ANNEXURE A: DISTRICT DELIVERY MODEL (DDM)

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 supporting decision-making	Various districts and metros	Various throughout country	Imraan Saloojee	High and medium resolution satellite imagery 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 districts and metros	Various throughout country	Thandile Vuntu and Dan Matsapola	Various rural schools and education NGOs
	Municipal training	Ngaka Modiri Molema District	Tswaing Local Municipality	Dan Matsapola	Ngaka Modiri Molema District

AREAS OF INTERVENTION	FIVE-YEAR PLANNING PERIOD				
	Project description	**District Municipality**	**Location: GPS coordinated**	**Project leader**	**Social partners**
		Waterberg District Ehlanzeni District	Mbombela is the local municipality		Waterberg District Ehlanzeni District
Economic and Infrastructure	Space Weather Centre	Overberg District Municipality	-34.42413 19.22485	Keenan Janneker	Not applicable
	Satellite imagery supporting spatial planning, infrastructure monitoring, and environmental resources management	Various districts and metros	25,53,14.66s 27.42.28,59e Data coverage is countrywide.	Imraan Saloojee	Not applicable
	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