



science and innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



SANSA
SOUTH AFRICAN NATIONAL
SPACE AGENCY

2021/2022 ANNUAL REPORT



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PUBLIC ENTITY'S GENERAL INFORMATION

REGISTERED NAME	South African National Space Agency (SANSA)
REGISTERED NUMBER	Not applicable
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LIST OF ABBREVIATIONS & ACRONYMS

ABBREVIATION	MEANING
ACAMS	Advisory Committee for Aeronautical Meteorological Services
AIT	Assembly Integration and Testing
APP	Annual Performance Plan
ARD	Analysis Ready Data
ARMC	African Resource Management Constellation
ATNS	Air Traffic Navigation Services
B-BBEE	Broad-Based Black Economic Empowerment
BIUST	Botswana International University of Science and Technology
BOSTEC	Bokamoso Science & Technology Education Centre
BRICS	Brazil, Russia, India, China, and South Africa
CDF	Concurrent Design Facility
CEO	Chief Executive Officer
CNSA	China National Space Administration
COPUOS	United Nations Committee on Peaceful Uses of Outer Space
COVID-19	Coronavirus Disease 2019

ABBREVIATION	MEANING
CPUT	Cape Peninsula University of Technology
CSIR	Council for Scientific and Industrial Research
DALRRD	Department of Agriculture, Land Reform and Rural Development
DDM	District Delivery Model
DEA	Digital Earth Africa
DESA	Digital Earth South Africa
DFFE	Department of Forestry, Fisheries and Environment
DHS	Department of Human Settlements
DPE	Department of Public Enterprises
DSI	Department of Science and Innovation
dtic	Department of Trade, Industry and Competition
EAG	Expert Advisory Group
EgSA	Egyptian Space Agency
EO	Earth Observation
EO4WQ	New Earth Observation Frontiers Earth Observation for Water Quality
EODC	Earth Observation Data Centre
ESA	European Space Agency
ET-SWX	Expert Team on Space Weather
EXCO	Executive Committee
GDPPFS	Global Data Processing and Forecasting System
GEN SPACE	Global Entrepreneurship Network Space
GIS	Geographical Information System
GNSS	Global Navigation Satellite System
HR	Human Resources
ICT	Information and Communications Technology

ABBREVIATION	MEANING
GPS	Global Positioning System
GRAP	Generally Recognised Accounting Practice
GTAC	Government Technical Advisory Centre
GTI	Geo Terra Image
HF	High Frequency
IAC	International Astronautical Congress
ICAO	International Civil Aviation Organisation
INFCOM	Commission for Observation, Infrastructures and Information Systems
ISO	International Organisation for Standardisation
IOCCG	International Ocean Colour Coordinating Group
IPT-SWeISS	Inter-Programme Team on Space Weather Information, Systems and Services
JERBC	Job Evaluation, Remuneration and Benefits Committee
MD	Managing Director
MDAsat	Maritime Domain Awareness Satellite
MoU	Memorandum of Understanding
MTSF	Medium-Term Strategic Framework
NEOFrontiers	New Earth Observation Frontiers
NEOSS	National Earth Observation and Space Secretariat
NOAA	National Oceanic and Atmospheric Administration
NRF	National Research Foundation
NT	National Treasury
OCIMS	National Oceans and Coastal Information Management System
PECASUS	Pan European Consortium for Aviation Space weather User Services
PFMA	Public Finance Management Act, (Act No. 1 of 1999), (as amended by Act No. 29 of 1999)

ABBREVIATION	MEANING
R&D	Research and Development
RIIS	Research Institute for Innovation and Sustainability
RMSE	Root-mean-square deviation
SAEON	South African Environmental Observation Network
SA-GEO	South African Group on Earth Observations
SAMSA	South African Maritime Safety Authority
SANSA	South African National Space Agency
SAWS	South African Weather Service
SC-ESMP	Standing Committee on Data Processing for Applied Earth System Modelling and Prediction
SCM	Supply Chain Management
SCOPA	Standing Committee on Public Accounts
SE	Space Engineering
SHEQ	Safety, Health, Environment and Quality
SIH	Space Infrastructure Hub
SME	Small to Medium Enterprise
SMME	Small, Medium and Micro Enterprise
SND	Space for National Development
SNP	Satellite Network Portals
SO	Space Operations
SS	Space Science
SSC	Swedish Space Corporation
STEM	Science, Technology, Engineering and Mathematics
SuperDARN	Super Dual Auroral Radar Network
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TEC	Total Electron Content

ABBREVIATIONS	MEANING
TEC	Total Electron Content
TIA	Technology Innovation Agency
TOS	Transfer-Orbit Support
UAV	Unmanned Aerial Drones
UJ	University of Johannesburg
UN	United Nations
UP	University of Pretoria
WG-MCRGG	Working Group on MET Cost Recovery Guidance and Governance
WMO	World Meteorological Organisation

Foreword by the acting

CHAIRPERSON



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During the Board's tenure we have been fortunate to witness excellent execution of construction of the new Space Weather Centre at the SANSA Hermanus facility...

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The past year has exposed the challenges in Government's ability to serve and protect citizens with incidents of unrest, climate change and natural disasters affecting the lives and livelihoods of thousands of South Africans following the years of struggle for yet thousands more from the global Covid-19 pandemic.

Through it all, technology has been the connecting force for knowledge sharing, provision of solutions and collaborations for greater good. As a proud technology organisation forging a legacy of impactful space investment, SANSA has had opportunity to contribute to efforts to address economic recovery as well as develop innovative solutions for future climate change challenges whilst continuing the pursuit for advanced technology in space weather and space mission support.

On review of the Agency performance this past financial year, I am delighted to share the impressive 94% delivery against set targets making a meaningful impact on Government's priorities and in service to the people of South Africa.

It is important to note that despite the challenges organs of state endure with regards to dwindling funding, SANSA has been able to maintain impeccable performance and achieve a clean audit.

This can be attributed to the sturdy leadership from the Department of Science and Innovation (DSI), Board, management, and employees in the executing of the Agency's Annual Performance Plan for the 2021-2022 performance year as well as capitalising on opportunities for developing space services, generating space knowledge and committing to grow the local space industry and formalising strategic global, regional and local partnerships.

Leading the Board of SANSA to the final term of its tenure has been a privilege and credit must be given to all the Board members for their contributions in executing governance oversight for SANSA. I am also cognisant of the contribution made by former Board Chairperson Ms Xoliswa Kakana and the former Chief Executive Officer, Dr Val Munsami during their tenure at the Agency in developing a new strategic direction for SANSA and express gratitude on behalf of the Board for their leadership and direction towards meeting the broader mandate for the Agency.

During the Board's tenure we have been fortunate to witness the excellent execution of construction of the new Space Weather Centre at the SANSA Hermanus facility that is to be launched and 24/7 operational by October 2022.

Progress against the Space Infrastructure Hub implementation has been slow; however, it is necessary to ensure due diligence is done effectively before proceeding with such a significant undertaking.

Other impressive achievements for the financial year under review include the meeting or exceeding of targets aligned to research output, acquisition and dissemination of quality satellite imagery, products and services to government, academia and private sector, industry support as well as establishment of Digital Earth Africa and growth in strategic partnerships.

The targets that were not achieved were aligned to internal initiatives that encountered delays, however these are now in progress.

The Agency is undergoing realignment to meet the delivery of the mandate that aspires to greater impact on the economy, industry and global space sector and the year ahead will mark a significant shift in the organisation as we move forward with implementation of a new business model that seeks to ensure the enhancement of SANSA's growth and sustainability.

If the past year is any indication, I am sure that the SANSA team will rise to the challenge of delivering meaningful services, tools, and knowledge to aid in

Governments' decision making and service delivery.

As I look towards the ambitious future facing SANSA and growing need to improve the lives of our citizens, I am hopeful that the Agency will acquire the support and resources needed to make the considerable impact space investment is guaranteed to bring.

I thank the Minister of DSI, the Director General and his team, my fellow Board members, Management, and employees of SANSA and all the partners of SANSA who have contributed towards the sterling performance of the Agency in the 2021/22 financial year and look forward to the 2022/23 financial year outcomes.

As we conclude our term, sincere appreciation goes to my fellow Board members for their unwavering support and insight in leading SANSA. To the new members who will be joining the Board, I wish them success in the execution of their governance duties.



Prof Azwinndini Muronga
Acting Board Chairperson

Acting Chief Executive Officer's OVERVIEW

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We trust in the support we receive from the DSI and other national funding instruments as SANSA strategic initiatives will ensure continued contribution by the space sector in the economic reconstruction and recovery of the country

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SANSAnites and Supporters of SANSA!

It gives me the greatest pleasure to be able to share the financial year 2021/22 annual organisational report of the South African National Space Agency as Acting CEO following the recent departure of Dr Val Munsami from the role of CEO in February 2022.

I am grateful for the leadership provided by Dr Munsami in the development of a new strategic direction and business model for SANSA with the aim of contributing to a more sustainable and responsive space programme for South Africa. Space has a major role to play in supporting the achievement of the aspirations of our government and society.

This past financial year has seen a great deal of change within the organisation also being impacted by change stemming from the COVID-19 pandemic, global politics and climate change that has influenced the global space industry. We saw the impact to the lives of the citizens we serve, and the world economies are under pressure to meet the needs of humanity.

As we manoeuvre through the consistent changing and challenging environment, it is testament to the hard work and commitment of our employees and

partners that we have achieved an impressive 94% against our performance targets for the financial year 2021/22.

Some of the performance highlights over the past financial year include the impressive construction project of South Africa's new Space Weather Centre with state-of-the-art infrastructure towards a 24/7 operational capability. The centre has achieved ISO 9001:2015 certification ahead of the planned launch in October 2022. We are also proud of the commencement of the transitioning of the Digital Earth Africa Programme Management Office to the African continent, gearing up for an African team that will manage the task of providing insights from Earth observation data products to the continent. An improvement in our BBBEE certification, Employment Equity targets and achieving a clean audit is a testament of the efforts the agency is making towards the transformation agenda of the country and financial stewardship.

Our researchers continue to inspire and lead in their fields of space physics and Earth sciences with incredible publication rates that place them in the top 10% of the country's contributors to physics research

and with a publication rate that is 50% higher than the national average. Beside generating research knowledge, we have also exceeded the number of students and interns directly supported in their career journeys.

With the gradual lifting of COVID-19 restrictions this past year, we are pleased to also report an increase in the number of youth, especially in rural communities, that we have reached through our science engagement across the country.

Another key strategic objective for SANSA is the growth of the local space sector and it is heartening to note that this sector saw increased investment through space core contracting and the launch of the NEOFrontiers research and development grant funding programme.

Our space operations services have continued to improve on the excellent quality record with a 99.7% satellite pass monitoring rate for Earth Observation satellite and saw revitalisation of the launch support services to the international space community.

Opportunities have also been shared through the vastly expanding network of local, regional, and international partnerships that SANSA is acquiring. Looking back to the contribution by SANSA towards the mandate of the Department of Science and Innovation (DSI) and the planned journey within the SANSA Strategic Plan for the next five years, I am eager to invest in and revamp the leap in impact delivered by this Agency.

The year ahead will see the organisation greatly transform through implementation of strategic initiatives including the transition to a new business model and organisational design and culture aimed at improving business efficiencies for growth and sustainability, the Space Infrastructure Hub, a large-scale investment programme in space data infrastructure and capability that aims to enhance the enabling role of SANSA in support of new and expanded space applications and most critically enable and support the growth of a South African space sector, the establishment of a deep space ground station network in Matjiesfontein to provide a national capability for lunar and moon mission support

and the contribution to the development of the national satellite communications strategy.

We trust in the support we receive from the DSI and other national funding instruments as these SANSA strategic initiatives will ensure continued contribution by the space sector in the economic reconstruction and recovery of the country.

I am very grateful to Minister Dr Blade Nzimande, the Director General Dr Phil Mjwara and team at the DSI, the former Chairperson of the Board Ms Xoliswa Kakana, the Acting Chairperson Prof Azwinndini Muronga, the Board members, the Executives, and the incredible team at SANSA and all our stakeholders - local and international, for their guidance, dedication, and support over the past 12 months.

As the famous African proverb submits; To go fast; go alone but to go far; go together, our achievements are shaped by the contribution of many and our journey of impact through *an integrated national space capability that responds to socio-economic challenges in Africa by 2030* is well underway to a very bright future.



Ms Andiswa Mlisa
Acting Chief Executive Officer

STATEMENT OF RESPONSIBILITY

CONFIRMATION OF ACCURACY OF THE ANNUAL REPORT

To the best of our knowledge, we confirm the following:

- All information and amounts disclosed in the annual report are consistent with the SANSA 2021/2022 Annual Financial Statements audited by the External Auditors.
- The annual report is complete, accurate, free from any omissions and has been prepared in accordance with the Public Entities Annual Report guidelines as issued by National Treasury.

- The Annual Financial Statements (Part E) have been prepared in accordance with the South African Standards of Generally Recognised Accounting Practice (GRAP) standards applicable to the public entity.
- The Accounting Authority is responsible for the preparation of the Annual Financial Statements and for the judgements made in this information.

● The Accounting Authority is responsible for establishing, and implementing a system of internal control that has been designed to provide reasonable assurance as to the integrity and reliability of the performance information, the human resources information and the Annual Financial Statements.

● The external auditors are engaged to express an independent opinion on the Annual Financial Statements.

In our opinion, the annual report fairly reflects the operations, the performance information, the human resources information and the financial affairs of the entity for the financial year ended 31 March 2022.

Yours faithfully



Ms Andiswa Mlisa
Acting Chief Executive Officer



Prof Azwinndini Muronga
Acting Chairperson of the Board

STRATEGIC OVERVIEW

SANSA VISION AND MISSION

The entity's vision and mission are a major driving force behind SANSA's commitment to repositioning the South African space programme and ensuring that the agency is central to the socio-economic-environmental development of the continent.

VISION

"An integrated national space capability that responds to socio-economic challenges in Africa by 2030"

MISSION

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

SANSA VALUES



All activities carried out during the financial year under review were underpinned by six 'STRIPE' values.

These core organisational values remain crucial to the transformation of SANSA into a high-performing agency.

08. LEGISLATIVE AND OTHER MANDATES

LEGISLATIVE MANDATE

SANSA, a Schedule 3A national public entity that was established in terms of the Public Finance Management Act (PFMA), No. 1 of 1999. The legislative mandate is premised on two primary Acts, namely (i) the Space Affairs Act (Act No. 84 of 1993) and (ii) the South African National Space Agency (SANSA) Act (Act No. 36 of 2008). The former, an instrument of the dtic, caters for the regulatory/policy context for the South African space programme, whereas the latter, an instrument of the Department of Science and Innovation (DSI), enables the establishment of SANSA as an implementing agency for the South African space programme.

The agency's priorities during the 2021/2022 financial year were informed by the following key objectives as provided in the SANSA Act:

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

POLICY MANDATE

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:

- 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;
- 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;
- Facilitate the provision of appropriate and adequate space capabilities to support South Africa's domestic and foreign policy objectives;
- Foster a robust science and technology base in research institutions and the higher education sector;
- 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;
- Promote the development of an appropriate and competitive domestic commercial space sector in order to provide the industrial base to meet the nation's needs for space technology;
- Promote improved cooperation with other nations in the mutually beneficial peaceful uses of outer space; and
- Promote greater awareness and appreciation, at all levels of South African society, of the relevance and benefits of space science and technology.

ORGANISATIONAL STRUCTURE

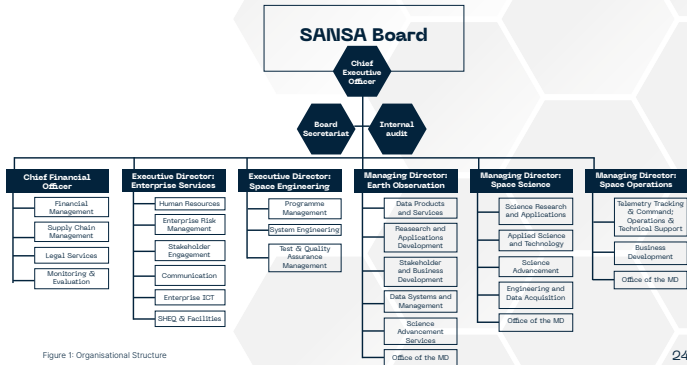


Figure 1: Organisational Structure

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09.SITUATIONAL

ANALYSIS

9.1 INTEGRATED IMPACT REPORT

From Research to Application – how SANSA deploys research to real life applications

Research done at the South African National Space Agency (SANSA) can be placed in the top 10% of research output when compared to South African Universities, with an average publication rate of three peer reviewed publications per researcher per year. SANSA has an illustrated expertise in the



Figure 2: The SANSA Space Weather Team And Researchers In Front Of The New Operational Space Weather Centre Where Space Weather Research Is Being Used For Real-Life Applications.

entire value chain from research, to development, to application. The Geomagnetic Field Model, an annual product produced by SANSA, is a prime example of how research done on the geomagnetic field can be presented as a model with real-life applications such as land based mapping and surveillance.

Research done on the impact of space weather on the ionosphere is used to develop products and

services for the SANSA Space Weather Centre. These products and services provide lifesaving information to the aviation sector and empower decision makers with the right information at the right time. One such product, AfriTec – a map over Africa utilising real time data to provide a forecast of the total electron content (TEC) – was completed in 2020 and is now in the user acceptance phase of product testing, illustrating the Research and Development (R&D) capability at SANSA. This product is important as it provides information on disturbances in the near Earth space environment that impact communications and navigation applications.

To ensure Earth Observation products and services close the Research and Development value chain, SANSA conducted an eight-month user requirement study. Advisory groups, linked to the neo-frontiers programme were created to ensure end-user participation in the study. The purpose of the user study is to develop a framework of the Earth observation needs for the next decade and create an ecosystem for a vibrant space sector in South Africa.

SANSA represented on international space weather forum

Dr Lee-Anne McKinnell, SANSA Managing Director has been nominated as the co-chair of the World Meteorological Organisation (WMO) Expert team on Space Weather (ET-SWx). The ET-SWx has been established to lead the delivery of the space weather related research to operations and stakeholder engagement activities of WMO in close coordination with the relevant WMO bodies. It follows work done by the WMO Inter-Programme Team on Space Weather Information, Systems and Services (IPT-SWElSS), however, with a broader mandate. ET-SWx is established under the Commission for Observation, Infrastructures and Information Systems (INFCOM) and reporting to Standing Committee on Data Processing for Applied Earth System Modelling and Prediction (SC-ESMP) in order to benefit from the Global Data Processing and Forecasting System (GDPFS) end-to-end systems model in support of the development of operational services.

Dr Lee-Anne McKinnell was a long time active member of the WMO IPT-SWElSS, and due to her role in this team as well as South Africa's progress in developing space weather capability, Dr McKinnell has been

nominated to co-chair the new WMO Expert team for the foreseeable future. She will co-chair with Dr Kirsti Kauristie from the Finnish Meteorological Institute. The expert team will include approximately 30 members from around the world as well as other global space weather forums. This is a significant honour and recognition for the work that South Africa, through SANSA, has put in to ensuring a credible internationally recognised space weather programme. It also means that South Africa will continue to contribute towards the global challenge of space weather.

Quality Assurance unlocks service excellence at the SANSA Hermanus facility

The SANSA Hermanus Facility has achieved ISO 9001:2015 certification for its products and services. The adoption of a Quality Management System is a strategic decision for SANSA to deliver quality products and services from the specialised facility in Hermanus. Over the past three years the team have been preparing each unit and setting up systems to ensure that certification is possible. The team successfully passed the stage 2 audit in February 2022 and the ISO certificate was issued



Figure 3: The SANSA Hermanus Team that contributed towards ISO certification

on 28 February 2022. ISO certification was one of the requirements by the International Civil Aviation Organisation (ICAO) upon designating SANSA as a regional Space Weather Centre for the aviation industry.

The Quality Management System for SANSA Hermanus ensures that processes are followed to ensure the best products and services to clients of the new Space Weather Centre. This quality assurance gives peace of mind to existing and prospective clients. Products and services are tailor-made with

the end-user in mind, which means that clients can rest assured that accurate, timeous and relevant information will be available and communicated at the right time to empower decision makers.

African Instrumentation Network – securing near real-time data to operationalise space weather

SANSA has more than 80 years of experience with ground based instrumentation networks. Its current instrumentation network spans over 80 sites in Southern Africa, the islands in the Southern Ocean and Antarctica. Expanding into the rest of the African continent was the next logical step. The African Instrumentation Network Project is a sub-project for the Operational Space Weather Services project and is focused on the deployment of real-time Global Navigation Satellite System (GNSS) instruments in African countries to address the lack of data on the continent. The operational Space Weather Centre requires real-time data for its products to warn stakeholders and clients of the adverse effects of space weather on our technological systems. In order to ensure real-time data is delivered to the Space Weather Centre, SANSA sought out partners in Africa

that have the required infrastructure, reliable power, internet, security and an interest in the data itself.

SANSA designed and implemented an NTRIP Caster and Client system which handles the ingress and dissemination of the real-time data. A successful installation of GNSS instruments was concluded in Zambia and Botswana. The next installation is planned for Zimbabwe. Two further installations were done remotely in Kenya and Nigeria. These installations follow many engagements with the host institutions to pave the way for MoUs and hosting agreements. The goal of the project is to install eight new scintillation stations and a number of reference stations in the mid-to-low latitudes. Sites for new geomagnetic stations in Africa are also being identified to expand and improve the network of magnetometers. SANSA is looking at real time ionosonde data in South Africa. Due to the high cost of ionosondes, however, it is not feasible to roll out ionosondes in other African countries without a very strong partnership or funding agreement.

Space weather research and its potential impact on food security

Scientists have been studying the possible correlation



Figure 4: Jean van Zyl, SANSA Business Developer and Stakeholder Practitioner, Jonathan Ward, SANSA Engineering and Data Acquisition Manager and Dr Emmanuel Nahayo, SANSA Scientific Data Analyst travelled to Botswana and met with various stakeholders such as the Botswana International University of Science and Technology.

between sun spot cycles and crop yields since the early 19th century with varying results and no conclusive result to date. Several recent papers have managed, however, to find correlation between sun spot cycles and crop yields, when looking at a specific crop in a specific region, taking into account the region's terrestrial weather cycles and the conditions in which the crop thrives.

One such example is a study focusing on the relation between crop yields of teff, wheat, and maize alongside sunspot number, temperature, and precipitation. These factors were analysed in each agro-ecological zone using 31 years (1990 to 2019) of data over the Chokie mountain basin in Ethiopia. "Generally, the occurrence of space weather (measured with sunspot number) leads to reduction of wheat and teff over the study area. Hence, shifting cultivation strategy is needed for local communities during the occurrence of the 11-year solar cycle frequency," – Birhan M W and Tariku, S 2021 Investigating the impact of space weather on agriculture products over Chokie mountain basin in Ethiopia.

Another study indicated sunspot activity might affect crop yield in Texas wheat yields which declined by 7% in periods of low sun spot activity, while output rose by 4% during active sun spot periods.

The ability to forecast the impact and effect of space weather on crop yields would be greatly advantageous to the South African Agricultural sector and contribute toward greater crop yield and food security. This illustrates the importance of space weather research being conducted at SANSA and its contribution toward a sustainable food secure future for South African citizens.

Engaging the youth and public ignites the passion for space

One of the consequences of living in an unequal society is that many children are left without access and opportunities to enter the world of science, technology and innovation. A small team from SANSA, however, are dedicating their time and resources to reach these learners and expose them to the possibilities of a career in Science, Technology, Engineering and Mathematics (STEM).

The SANSA Science Engagement teams were tasked with reaching learners during the 2021/22 financial year and the teams from Space Science and Earth Observation travelled the country to not only meet this objective, but to leave a lasting impact on our youth. Overall, the team travelled to various provinces and district municipalities during the financial year.

In May 2021, both teams travelled to the Harry Gwala District Municipality in Kwazulu Natal, armed with information about careers in space and practical science demonstrations linked to their science curriculum. The teams visited a total of 12 schools and reached 1,165 learners and laid the foundation for long-term engagements and ongoing support to the district. The Harry Gwala district is made up mostly

of rural settlements with 53% of the population living in traditional homes and 15% of the population has no access to electricity. The schools there are typically strapped for resources and not in a position to expose its learners to the possibilities of a career in STEM.

The engagement was requested by a teacher from Shayamoya Area Secondary School who visited the SANSA Hartebeeshoek campus in 2016. This was an experience she never forgot, and when she was promoted to the school district, she initiated a conversation with SANSA to visit the schools within the Harry Gwala district. The approach of doing science engagement in accordance to the Presidential District Model was executed very successfully in the Harry Gwala District and is an approach that will be followed in the next financial year. This is further strengthened by presenting content that is relevant to the specific province.

The engagement did not end after the visit to the schools and a WhatsApp group was created for the Science Engagement team, the education officials and the science teachers within that district. The SANSA team continue to give support to the district through this WhatsApp group and a follow up engagement is planned in the next financial year. This time SANSA will

return with partners such as ZA Robotics and other DSI entities such as CSIR.

The feedback from this engagement has been extremely, positive and was featured in a local newspaper.



Figure 5: The Science Engagement Teams do hands-on science related activities with learners from the Harry Gwala District



Figure 6: The Science Engagement Teams visit township schools in Cape Town.

A similar District approach was taken when a teacher from Cape Town reached out to the Science Engagement teams to visit schools in Cape Town's townships. A passionate science and math teacher from Manzomthombo Secondary School, Memory Dhiza, was referred to SANSA by a member of the South African Astronomical Observatory. Memory recently completed her post graduate studies in Space Science, Geographical Information System (GIS) and Remote Sensing at the United Nations (UN) Training Centre for English-speaking countries in Africa and has been a Space Ambassador in the classroom ever since. Memory put together a list of 10 schools in Cape Town and the Science Engagement Teams visited these schools in February 2022.

This was the first time SANSA visited these schools and the response was overwhelmingly positive. The team reports that the learners were enquiring about career opportunities and where and what they could study to pursue a career in space. Several of the Cape Town schools have since paid a visit to the SANSA facility in Hermanus where the learners were shown the Science Centre, did practical hands-on science activities and could engage the team on STEM career advice.

Two important lessons learned from the Harry Gwala and Cape Town visits were that the two Science Engagement teams work very well together and their engagement styles and content are complementary. The second lesson is that an inspired teacher can be a catalyst for successful outreach campaigns.

This is one of the reasons that SANSA is also present teacher workshops with the them Earth and Beyond where teachers are taught how to do easy hands-on science activities that do not require expensive resources. These workshops have also resulted in many more schools visiting the SANSA Hermanus facility or requesting further engagements with SANSA. The hope is that even more learners are positively impacted when the teachers to go back to their classroom and inspire their learners to nurture a curiosity about space, science, technology and innovation.

SANSA uses space exhibit in EC to support DDM and STEM education

The SANSA space exhibit that was developed alongside the Cape Peninsula University of Technology (CPUT) space exhibit in the middle of October 2021 launched the DSI Flagship Albertina Nontsikelelo



Figure 7: SANSA leverages the space exhibit in Cofimvaba to broaden space awareness in the Eastern Cape Province



Figure 8: SANSA delivers ZACUBE-02 satellite model to six Science Centres in three Provinces

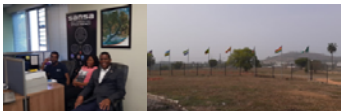


Figure 9: SANSA hosting Memory Dizha before her trip to Nigeria to study space science for 10 months.

Sisulu Science Centre in rural Cofimvaba village. It has provided an opportunity to reimagine province-wide space awareness interventions by SANSA in support of STEM education in the Eastern Cape Province beyond the Chris Hani District. Working with Physical Science Subject Advisors in the various districts, SANSA has directly engaged 1,024 learners in the Chris Hani, 2,435 learners in the O R Tambo Inland and Coastal, and 1,855 learners in the Amathole East Districts. SANSA has broken the record with 5,314 youth engagements in the Eastern Cape Province during the 2021/22 financial year.

SANSA supports the National Network of Science Centres to promote space

Following the first five deliveries of the ZACUBE-02 satellite models in Gauteng, Limpopo, Mpumalanga, and KwaZulu Natal Science Centres during the financial year, SANSA continued with space education support mechanisms for the National Network of Science Centres. ZACUBE-02 satellite models and posters of the National Oceans Information Management System (OCIMS) was delivered to four Limpopo-based science centres, namely, Bokamoso Science

& Technology Education Centre (BOSTEC), Vuwani Science Resource Centre, Phalaborwa Foundation, Giyani Science Centre as well as the FOSST Discovery Centre of the University of Fort Hare and the Cape Town Science Centre.

SANSA collaborates with local Classroom Space Ambassador to reach township learners

Following the inspiration that was provided by SANSA in 2011 when educators around Cape Town were invited to attend the South African-hosted International Astronautical Congress (IAC) exhibition, Memory Dizha, the Mathematics and Physical Science teacher at Manzomthombo Secondary School decided to pursue her studies in space science at the United Nations Centre for English-speaking countries in Africa. The SAAO referred Memory to SANSA for support with her 10 months of studies in Nigeria and upon her return to the classroom as the Classroom Space Ambassador, helped SANSA to break into the Western Cape Education Department when she organised SANSA space awareness workshops at 10 schools in the Cape Town Metro during February 2022.



Figure 10: SANSA inspires youth at the Cape Town Metro township schools through Space awareness sessions

International Impact:

SpaceOps 2021 – Virtual Edition

In 2016, SANSA won the bid to host the 2020 International Space Operations Conference, dubbed SpaceOps – a first for South Africa and the African continent. The official announcement was made in Marseille, France during the 15th SpaceOps Conference.

Since the inception of SpaceOps in 1990, the organisation has hosted sixteen biennial conferences in various countries around the world, with SANSA participating in the conference from 2010.

With more than eight years' participation in SpaceOps conferences, SANSA was set to bring an unforgettable African experience to SpaceOps 2020 in Cape Town; unfortunately, this was drastically halted by the global COVID-19 pandemic. The conference was eventually postponed to 3-5 May and converted into a virtual event.

With many COVID-19 travel restrictions in place, SpaceOps 2021 – Virtual Edition provided industry players and delegates from around the world the opportunity to participate in the conference and appreciate diverse and interesting topics from the comfort of their homes and offices.

During the conference, delegates were given opportunities to foster managerial and technical interchange on all aspects of space mission operations, including robotics, human, earth-orbiting and deep space aspects of space operations.

The conference was themed, "Beyond Boundaries to Human Endeavours", which tied in well with the fact that the event was virtual, reiterating the notion that physical boundaries should not limit engagement on matters relating to space and our future.

SANSA Awarded ISO 45001

A decision was taken to transition from ISO



Figure 11: SANSI Space Operations Awarded ISO 45001

18001:2007 to ISO 45001:2018 to align and integrate all health and safety governance processes and system elements within SANSI. ISO accreditations are critical because they enable SANSI Space Operations to provide reliable customer service to its international clientele by maximising the unique sets of assets available at the site.

The transition was required because ISO 18001:2007 focused mainly on “managing the occupational health and safety hazards and issues related to it” while also placing emphasis on why the hazard occurred instead of solutions. The ISO 45001 focuses on the “interaction between the working environment and the organisation” with the aim to manage both the risk and opportunities. This extends the scope of

workplace health and safety management to include the minimisation or elimination of any hazard. The other advantage of ISO 45001 is that it integrates easily with ISO 14001:2015 and ISO 9001:2015.

Upon undergoing a rigorous audit process, SANSI was awarded ISO 45001:2018 Occupational Health and Safety System (OHS) standards. This accreditation further strengthens the investor and customer confidence that SANSI delivers reliable services that are congruent to the international standards in line with SANSI mandate and strategic intent. To ensure that the site maintains this certification, continuous monitoring and testing of the business processes will be conducted to improve the existing standards for organisational efficiency.



10.EXTERNAL AUDIT REPORT:

PREDETERMINED OBJECTIVES

The External Auditors perform the necessary audit procedures on the Agency's performance information to provide reasonable assurance in the form of an audit conclusion. The audit conclusion on the performance against predetermined objectives is included in the report to management, with material findings being reported under the Predetermined Objectives heading in the Report on other legal and regulatory requirements section of the auditor's report. Refer to pages 194 – 202 of the Report of the Auditors Report, published as Part E: Financial Information.

10.1 SERVICE DELIVERY ENVIRONMENT

SANSA's facilities are distributed as follows; Head Office in Pretoria oversees SANSA operations and management; the Earth Observation programme (currently based at the Innovation Hub in Pretoria); the Space Operations programme (formerly the Satellite Application Centre, located in Hartebeesthoek); and the Space Science programme (former Hermanus Magnetic Observatory, located in Hermanus); as well as a Space Engineering programme situated alongside the Head Office.



The entity's performance, as driven by its five core programmes during the 2021/22 financial year reflected an overall achievement of 94% against the planned targets provided in the revised Annual Performance Plan (APP) for the same period.

The Skills Audit project only kicked off in the fourth quarter of the financial year resulting in the 2021/22 target for initiatives to transform SANSA into a high performing agency not being met by year-end. The delayed transfer of the Houwteq facility from Denel to SANSA also negatively impacted establishment of an Assembly, Integration, and Testing (AIT)

facility by the entity to ensure the provision of relevant support to the local space industry. Tireless efforts by Management, however, to engage Denel and the Department of Science and Innovation (DSI) amongst other key stakeholders have forced the need for exploration of alternatives and subsequent development of a revised implementation plan for this project options. There are still risks associated with shifts in the industry's current usage of Houwteq and industry requirements that will need to be closely monitored during the rollout

of the revised project implementation plan.

SANSA is proud to have covered significant ground in relation to the construction of the 24/7 Operational Space Weather Services Project, which would not have been possible without the support provided by the DSI. The project remained on track at 70.1% towards completion during the reporting period and remaining business case objectives are expected to be met by October 2022. The Agency's Hermanus facility also secured ISO 9001:2015 certification for its products and services during the final quarter of 2021/22 due to unceasing preparations in setting up systems to ensure certification.

10.2 ORGANISATIONAL ENVIRONMENT

The Government Technical Advisory Centre (GTAC) supported the Agency to develop a business model and macro structure during the financial year under view with the aim of enhancing SANSA's

ability to deliver more effectively on its mandate and improve its sustainability. The unveiling of the new business model in the final quarter of the financial year marked a significant milestone in SANSA's strategic trajectory and at year-end focus remained on the phased - out transitioning of the organisation in alignment with this model.

10.3 KEY POLICY DEVELOPMENTS AND LEGISLATIVE CHANGES

The institutional policies and strategies, as reflected in the revised 2020 - 2025 Strategic Plan, remained relevant for the 2021/22 Financial Year.

The Science and Technology Laws Amendment Act has been promulgated and the implications to SANSA will be studied and enforced, as part of our regulatory compliance measures. It should also be noted that the Department of Trade, Industry and Competition (the dtic) is in the process of revoking and replacing the Space Affairs Act.

11. KEY STRATEGIC OUTCOMES

As informed by the national 2019-2024 MTSF strategic priorities, the Agency has identified six key outcomes in its 2020-2025 Strategic Plan in order to move towards stimulating a capable and globally competitive South African space sector and these will be central to the implementation of this 2021-2022 APP:

- **Outcome 1:** Increased space relevant knowledge that supports the developmental agenda;
- **Outcome 2:** Growth of the space sector through SANSA space related industry expenditure;
- **Outcome 3:** Increased human capacity for the implementation of key space initiatives;
- **Outcome 4:** SANSA re-positioned as a key enabler of government's space related policies;
- **Outcome 5:** Appropriate infrastructure developed to support the local space sector; and
- **Outcome 6:** Increased market share of the global space operations market.

11.1

2020/2025 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 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 Applicable for 2021/22 FY Revised for 2022/23 to 2024/25 planning period, as follows: Stimulated and growing, inclusive space sector	O2.1. Average operational expenditure spend on SMEs	New indicator	Lower target: 20% Desired target: 30% Upper target: 40%

OUTCOME	OUTCOME INDICATOR	BASELINE	FIVE-YEAR TARGET MARCH 2025
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

OUTCOME	OUTCOME INDICATOR	BASELINE	FIVE-YEAR TARGET MARCH 2025
2019-2024: Priority 2 – Economic transformation and job creation			
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	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%
Table 1 : SANSA Strategic Outcomes, Outcome Indicators and Five-year Targets			

11.2 PROGRESS TOWARDS ACHIEVEMENT OF KEY STRATEGIC OUTCOMES

The Agency achieved an overall performance level of 94% for the Annual Performance Plan targets set for the 2021/22 financial year as at the end of the fourth quarter. This serves to confirm its consistency in terms of ensuring performance standards that have been above the 80% threshold on a quarterly basis since the beginning of the current financial period.

Legend: Targets not achieved



Targets achieved



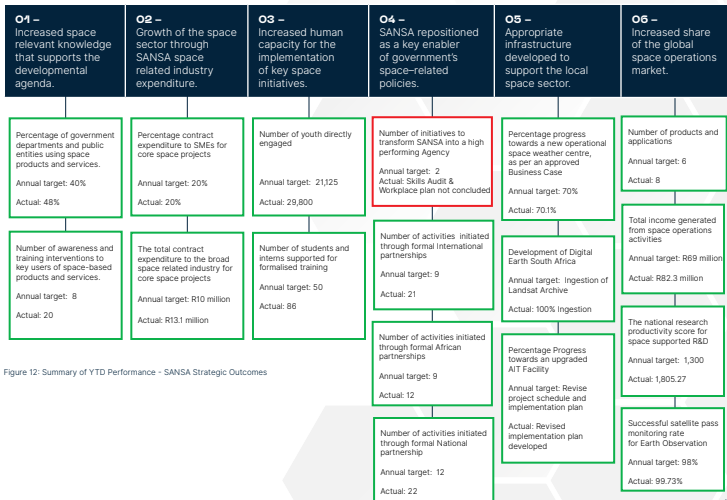


Figure 12: Summary of YTD Performance - SANSa Strategic Outcomes

11.3 CONSOLIDATED PERFORMANCE INFORMATION

OUTCOME	OUTCOME INDICATOR	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O1 Increased space relevant knowledge that supports the developmental agenda	O1.1.1.1 Percentage of government departments and public entities that are using space products and services	40%	48%	+8%	Annual target exceeded due to realised opportunities for government departments and public entities using space products and services
	O1.2.1.1 Number of awareness and training interventions to key users of space-based products and services	8	20	+12	Annual target exceeded due to additional awareness and training interventions held

OUTCOME	OUTCOME INDICATOR	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O2 Growth of the space sector through SANSA space related industry expenditure	O2.1.1.1 Percentage contract expenditure to SMEs for core space projects	20%	20%	No variance	Annual target met
	O2.2.1.1 The total contract expenditure to the broad space related industry for core space projects	R10 million	R13.1 million	+R3.1 million	Annual target was exceeded due to various projects aimed at developing the broad space related industry
O3 Increased human capacity for the implementation of key space initiatives	O3.1.1.1 Number of youth directly engaged	21,125	30,320	+9,195	Annual target exceeded due to additional opportunities realised
	O3.2.1.1 Number of students and interns supported for formalised training	50	86	+36	Annual Target was exceeded due to additional support provided to students and interns

OUTCOME	OUTCOME INDICATOR	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O4 SANSA re-positioned as a key enabler of government's space-related policies	O4.1.1.1 Number of initiatives to transform SANSA into a high performing Agency	2 Skills Audit and Workforce Plan	Skills Audit and Workplace Plan not concluded	-2	The Skills Audit project was launched in January 2022 and the Workforce Plan is one of the deliverables for this project. The project is to be concluded in the 2022/23 financial year
	O4.2.1.1 Number of activities initiated through formal International partnerships	9	21	+12	Annual target exceeded due to additional partnerships initiatives pursued and new opportunities
	O4.2.1.1 Number of activities initiated through formal African partnerships	9	11	+2	Annual target exceeded due to additional partnerships initiatives pursued and new opportunities
	O4.2.1.2 Number of activities initiated through formal National partnerships	12	22	+10	Annual target exceeded due to additional partnerships initiatives pursued and new opportunities

OUTCOME	OUTCOME INDICATOR	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O5 Appropriate infrastructure developed to support the local space sector	O5.1.1 Percentage progress towards a new operational space weather centre, as per an approved Business case	70%	70.1%	+0.1%	Annual target met
	O5.2.1 Development of Digital Earth South Africa	Ingestion of Landsat archive	100% ingestion	No variance	Annual target met
	O5.3.1 Percentage progress towards an upgraded AIT Facility	Revised project schedule and implementation plan	Revised project schedule and implementation plan	No variance	Annual target met
O6 Increased market share of the global space operations market	O6.1.1 Total income generated from space operations activities	R69 million	R82.3 million	+ R13.3 million	Annual target was exceeded due to additional income generation
	O6.2.1 Number of products and applications	6	8	+2	Annual target exceeded due to provision of additional products
	O6.3.1 The national research productivity score for space supported R&D	1,300	1,805.27	+505.27	Annual target was exceeded due to numerous publications
	O6.4.1 Successful satellite pass monitoring rate for Earth Observation	98%	99.73%	+1.73%	Annual target was exceeded due to maintenance and Capex replacements

Table 2: Consolidated Annual Performance

12. PERFORMANCE INFORMATION

BY PROGRAMME

PROGRAMME 1: ADMINISTRATION

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

The focus of the Administration Programme is to ensure the Agency's mandate is efficiently and effectively executed, a strong focus on new business development, effective engagement with key stakeholders, and the impactful communication and promotion of SANSAs activities, are part of the priorities for this programme.

PROGRAMME 1: ADMINISTRATION

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The focus of the Administration Programme is to ensure the Agency's mandate is efficiently and effectively executed, a strong focus on new business development, effective engagement with key stakeholders, and the impactful communication and promotion of SANSA's activities, are part of the priorities for this programme.

PROGRAMME OUTPUTS

The core outputs of the Administration Programme are to:

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

PROGRAMME 1: PERFORMANCE AGAINST 2021/2022 OUTPUT INDICATORS AND TARGETS

OUTCOME	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O4 SANSA re-positioned as a key enabler of government's space-related policies	O4.1.1 Initiatives to transform SANSA into a high performing Agency	O4.1.1.1 Number of initiatives to transform SANSA into a high performing Agency	2 Skills Audit and Workforce Plan	Skills Audit and Workforce Plan not concluded	-2	The Skills Audit project was launched in January 2022 and the Workforce Plan is one of the deliverables for this project. The project is to be concluded in the 2022/23 financial year

Table 3: Administration Performance

PROGRAMME 1: PERFORMANCE AGAINST 2021/2022 OUTPUT INDICATORS AND TARGETS

Stakeholder Engagement

Currently SANSA is party to six national partnership agreements; four continental partnership agreements; and twelve international partnership agreements at corporate level. SANSA also has programme specific arrangements either through agreements, projects and contracts.

National Stakeholder Engagements

Key national partnership initiatives thus far:

- In response to the SANSA and South African Weather Service (SAWS) Executives Meeting held in Q2, the technical teams held a workshop wherein they discussed the current MoU, updated one another on the current active projects, and proposed new projects including SIH user requirements; the Mercury Observations project; exchange of data for risk mapping; amongst other projects to be considered for implementation under the MoU.
- SANSA and the Council for Scientific and Industrial Research (CSIR) have concluded the process of nominating Steering Committee (SteerCo) members to drive their cooperation agreement. The first SteerCo Meeting was scheduled for 09 April 2022.

- SANSa and the National Earth Observation and Space Secretariat (NEOSS) of the CSIR, worked co-hosting their similarly aligned national events i.e., the Space for National Development (SND) Week; and the South African Group on Earth Observations (SA-GEO) Symposium respectively. The event was planned for 15-17 March 2022, with a physical attendance target audience of 250 people, but was postponed to a later date following the directive issued by the National Treasury on the ongoing case between the Minister of Finance vs AFRI business ZACC 4 on the Preferential Procurement Regulations, 2017, impacting on procurement by all Organs of State.

Continental

Key continental partnership initiatives thus far:

- SANSa supported by the DSI, hosted an African Resource Management Constellation (ARMC) Partnership Revival Workshop with the ARMC Partners. All ARMC partners expressed continued interest in the ARMC Project and have committed to resuscitating the ARMC Partnership.
- SANSa and the Egyptian Space Agency (EgSA) are planning to sign their cooperation agreement during a planned visit to Egypt by the DSI mid-May.

International Stakeholder Engagements

Key international partnership initiatives thus far:

- SANSA supported the DSI in the planning of the international "Eureka Meets the Atlantic" event, led by Portugal, which took place in Cape Town. The event featured a selection of Space Industry players (SMEs) who through a selection process were nominated to pitch for prize money to the value of 4,000 Euros to support their business.
- SANSA has concluded the process of nominations for the BRICS Space Cooperation Working Group and will now join the rest of the BRICS Space Agencies in implementing the BRICS EO Constellation Project as led by the China National Space Administration (CNSA).

Communications Protocol And Strategy

- The DSI awaits formal confirmation on the agreed upon text from their Cuban counterparts, which includes the SANSA request to include Space Cooperation in the South Africa-Cuba Ministerial Collaboration Agreement.
- SANSA supported the DSI, DIRCO and the dtic at the Science and Technology, of the United Nations Committee on Peaceful Uses of Outer Space (UNCOPUOUS). SANSA provided input to South Africa's interventions on Space Weather matters.

Over the 2021/22 FY SANSA saw progress and conclusion on major projects in Communications and acquisition of new members of the communications team to ensure representation at three programmes.

- The SANSA 10 Year commemorative Coffee table book was developed and will be distributed in the new financial year to celebrate the first decade of achievement of SANSA, building on the rich history of the Space Science and Space Operations facilities.

- The Agency undertook an extensive exercise of reviewing and revamping the SANSA brand and repositioning options as the Agency progresses on the business remodel and new strategic direction. A design and positioning proposal has been developed and is awaiting final approval prior to the implementation phase of the exercise.
- Organisation of the Space for National Development conference in partnership with the SA_GEO conference that was supposed to take place in March was temporarily postponed pending the Treasury ruling resulting in halted procurements. The event will be rescheduled in June or July 2022.

SANSA executed the successful profiling of the Agency and local industry with support from DSI, the dtic and Brand SA at the largest global space conference that was held in Dubai in October.

An impressive exhibition stand housing SANSA and eight local space companies provided the setting for engagements between the global space community and the South African space delegation at the International Astronautical Congress (IAC) 2021. Organisation for the upcoming IAC 2022 organisation has commenced; planning discussions underway with internal and industry stakeholders on participation at the exhibition and on the technical programme.

- Communication continues to support the execution of the Change Management process with celebrations of project milestones ensuring transparency and

contribution towards a united culture. Collateral is being developed to support the change management process and aligned to the new brand revamp project.

- The SANSA newsletter was developed and shared across the Agency and to stakeholders online. The evolution of the newsletter will also enable local industry to have a share of voice and gain exposure to SANSA stakeholders.
- Communications supported the resignation events for former CEO, Dr Val Munsami and ED: Space Programme - Mr Amal Khatri as well as the media announcements and interviews on the appointment of Ms Mlisa as Acting CEO.

- SANSA Communication Strategy and Action Plan is in development for EXCO approval in May 2022 following changes to the brand and the business model.
- SANSA through the DSI and its entities have acquired the services of a new media monitoring company and an expanded product offering for social media measurement.

The media coverage received this past financial year indicated an impressive Advertising Value Equivalency (AVE) of R17,215,867.39 across print, online and broadcast platforms. The AVE is the estimated monetary value to SANSA from free media through interviews with spokespeople and media releases distributed to media outlets.

PROGRAMME 2:

EARTH OBSERVATION

The Earth Observation Programme is responsible for the development and promotion of Earth observations products for socio-economic development and improved livelihoods in South Africa and the African continent.

The objective is to collect, assimilate and disseminate Earth observation data and products to support South Africa's policymaking and implementation for socio-economic growth through areas that include food security, water resource management, integrated spatial planning and land reform, disaster management, peace and security, oceans economy and global climate change.

PROGRAMME OUTPUTS

The core outputs of the Earth Observation (EO) programme include:

- Maintaining a long-term archive of satellite data for national benefits that is essential for change detection and for better understanding environmental change in time and space;
- Provision of state-of-the-art data infrastructure for the delivery of essential Earth observation services;
- Sector development through partnerships for learning (human capital development), growth, transformation, and competitiveness;
- Managing product and services to maturity to meet user information needs;
- Marketing Earth observations for understanding, creating, and delivering profitable value to customers; and
- Research, develop and innovate to transact at the cutting edge of global knowledge.

PROGRAMME 2: PERFORMANCE AGAINST 2021/2022 OUTPUT INDICATORS AND TARGETS

OUTCOME	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O1 Increased space relevant knowledge that supports the developmental agenda	O1.1.1 Increased percentage of government departments and public entities that are using space products and services	O1.1.1.1 Percentage of government departments and public entities that are using space products and services	40%	48%	+8%	Annual target exceeded due to realised opportunities for government departments and public entities using space products and services
	O1.2.1 Awareness and training interventions to key users of space-based products and services	O1.2.1.1 Awareness and training interventions to key users of space-based products and services	5	16	+11	Annual target exceeded due to additional awareness and training interventions held

OUTCOME	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O2 Growth of the space sector through SANSa space related industry expenditure	O2.1.1 Expenditure to SMEs for core space projects	O2.1.1.1 Percentage contract expenditure to SMEs for core space projects	20%	20%	No variance	Annual Target achieved
	O2.2.1 SANSa space related industry expenditure	O2.2.1.1 The total contract expenditure to the broad space related industry for core space projects	R10 million	R13.1 million	+R3.1 million	Annual target was exceeded due to various projects aimed at developing the broad space related industry
O3 Increased human capacity for the implementation of key space initiatives	O3.1.1 Increased youth awareness of science	O3.1.1.1 Number of youth directly engaged	16,125	22,224	+6,099	Annual target exceeded due to additional opportunities realised
	O3.2.1 Support to students and interns	O3.2.1.1 Number of students and interns supported for formalised training	20	25	+5	A successful recruitment drive resulting in additional students

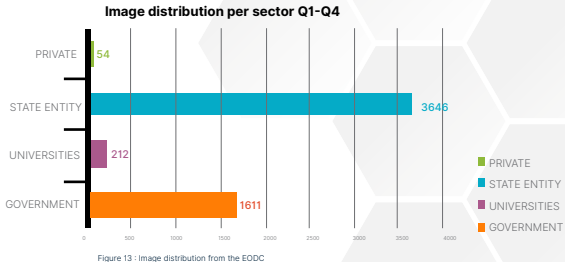
OUTCOME	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O4 SANSA re-positioned as a key enabler of government's space related policies	O4.2.1 Significant benefit for the space programme through partnerships	O4.2.1.1 Number of activities initiated through formal International partnerships	5	7	+2	Annual target exceeded due to additional partnerships initiatives pursued and new opportunities
		O4.2.1.2 Number of activities initiated through formal African partnerships	5	5	No Variance	Annual target met
		O4.2.1.3 Number of activities initiated through formal National partnerships	8	12	+4	Annual target exceeded due to additional partnerships initiatives pursued and new opportunities
O5 Appropriate infrastructure developed to support the local space sector	O5.2.1 Development of Digital Earth South Africa	O5.2.1.1 Development of Digital Earth South Africa	Ingestion of Landsat archive Development of Digital Earth South Africa	100% Ingestion	No Variance	Annual target met

OUTCOME	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O6 Increased share of the global space operations market	O6.2.1 Applications to address society's needs and challenges	O6.2.1.1. Number of products and applications	3 (Data as a service offering /Earth observation products / Services to support decision making) And Infrastructure as a service offering	3	No Variance	Annual target met
	O6.3.1 Increased national space research output	O6.3.1.1 The national research productivity score for space supported R&D	300	517.64	+217.64	Annual target was exceeded due to numerous publications

Table 4: Earth Observation Performance

PROGRAMME 2:

KEY ACTIVITIES / ACHIEVEMENTS FOR THE 2021/2022 FINANCIAL YEAR



During 2021/2022 SANSA distributed 3,646 images (65%) to State entities (Research Institutions and Parastatals), 1,661 (30%) to Government at Local, Provincial and National Level, 212 images (4%) to Universities and 54 images (1%) to the Private Sector through the Earth Observation Data Centre (EODC).

Supporting Decision Making and Decision Support Tools

Supporting fire investigations and Illegal Irrigation Investigations

A fire investigation is based on the use of remote sensing to determine where and when a fire started, the spread thereof and the extent of destruction caused by the fire. Fire investigations are often used as evidence for insurance claims or disputed claims which often result in court cases. In this financial year SANSA produced 38 fire reports and 17 fire maps for external clients.

An irrigation investigation is based on the Water Act of 1998 and provides evidence to support legal processes at the water tribunal. SANSA produced 12 irrigation reports and one irrigation map during the financial year under review.

Fraud investigations into alleged falsified agricultural insurance claims can be supported by satellite imagery that provides evidence on the existence of legal or illegal farming. SANSA provided evidence in one agricultural fraud investigation during the financial year.

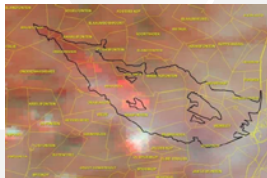


Figure 14: A MODIS image on 13 October 2021 at 13h30 depicted farm boundaries (yellow lines) and the superimposed fire scar (black line)

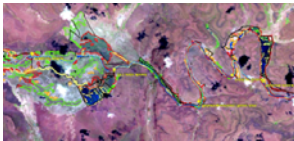


FIGURE 15: Map indicating illegal use of water for irrigation in Northern Cape

Mzansi-Amanzi National Water Quantity Information Service

Water is one of the most significant resources for the sustainability of life on Earth. It underpins economic development, food security and human/ animal and plant survival. It is therefore critical to have a state of water resources monitoring system across the

country for management purposes and policy planning. Since June 2020 through a licence agreement with GeoTerra Image (GTI), SANSA enabled the provision of monthly surface water area and dam water volume levels data for water bodies across South Africa,. The Mzansi-Amanzi National Water Quantity Information Service is made available to the Department of Water and Sanitation and other interested stakeholders across South Africa.

The service provides monthly water quantity data and associated monitoring reports which include:

- Status Surface Water Resources Across South Africa
- Catchment Level Summaries Surface Water Resources
- Water Monitoring Reports

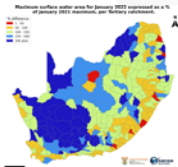


Figure 16: Monthly water monitoring report example 1. Short-Term Comparison of total surface water area for January 2022 (month versus the same month in the previous year).

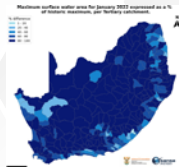


Figure 17: Monthly water monitoring report example 2. Short-Term Comparison of total surface water area for January 2022 (month versus historic maximum).



Figure 18: Open access web based portal water area monitoring

In addition to the monthly data and monitoring reports, which are currently only available to government users, Mzansi-Amanzi also provides a publicly available web based decision support portal for all users. The Mzansi-Amanzi decision support portal, available at <https://www.water-southafrica.co.za/>, provides a near-real time water monitoring service, indicating the area of available water per water management region for both natural and man-made water features, and volume status of water resources across South Africa.



Figure 19: Mzansi-Amanzi portal indicating volume estimates and dashboards.

The licence agreement allows SANSA to distribute the data to other government entities without them incurring further costs. Currently the following entities receive the data:

GOVERNMENT

- Department of Water and Sanitation
- Department of Forestry, Fisheries and the Environment
- Nelson Mandela Bay Municipality (metropolitan)
- West Rand District Municipality

WATER AUTHORITY

- Inkomati-Usuthu Catchment Management Agency
- International Water Management Institute, South Africa (IWMI-SA)

GOVERNMENT ENTITY

- Development Bank of South Africa
- Housing Development Agency
- Gauteng Provincial Disaster Management Centre
- KwaZulu Natal Wildlife
- SANPARKS

RESEARCH COUNCIL AND ACADEMIA

- Council for Scientific and Industrial Research
- South African National Biodiversity Institute
- University of South Africa
- University of Kwa-Zulu Natal
- Rhodes University
- Stellenbosch University
- Agricultural Research Council – Natural Resources and Engineering (ARC –NRE)/University of Witwatersrand

PRIVATE SECTOR

- GeoNest

Figure 20: Entities receiving data

Support the Development of a Critical Mass of Skills

SANSA provides free data to students for research and education purposes. The table below provides an overview of the use of satellite imagery provided by SANSA for student research. SANSA supported 10 students including one Honours, seven MSc's, one PhD and one Post Doctoral student.

Students supported by SANSA with Earth observation data in 2021/2022

NO	UNIVERSITY	LEVEL	RESEARCH TOPIC
01	North West University	MSc	The effect of fire suppression in Mafikeng Game Reserve on the vegetation.
02	Nelson Mandela University	MSc	The Succession of Thicket Vegetation in an Abandoned Open-cast Limestone Mine
03	University of Kwazulu Natal	MSc	Improving the Hydrological Modelling of Urban Areas
04	University of Western Cape	PostDoc	Investigating the dynamics of mangroves located in urban and rural environments across South Africa, objective: to map changes and assess the effects of disturbances on mangrove systems.
05	Rhodes University	MSc	Hydrological model: catchment water balance assessment

NO	UNIVERSITY	LEVEL	RESEARCH TOPIC
06	University of Venda	MSc	Evaluation of high-resolution satellite spectral configuration in mapping tea health indicators in relation to climate change: A case study in Tshivhase Tea Estate
07	University of Kwazulu Natal	PhD	Mapping of tree abundance in the Buffelsdraai area located in Ethekwini municipality, in KwaZulu Natal
08	University of Kwazulu Natal	Honours	Mapping urban sprawl in the Greater Edendale area of KwaZulu-Natal
09	University Of Witswatersrand	MSc	Development of a GIS site suitability model to map Mozambique tilapia pond aquaculture farming in Limpopo
10	University Of Johannesburg	MSc	Using remote sensing to examine Marula tree (<i>Sclerocarya birrea</i>) vigor in response to climatic conditions in the Kruger to canyons biosphere reserve region

Table 5 : Student research supported by SANSA Earth observation data in 2021/2022

Africa Earth Observation Challenge

Since 2016 SANSA has partnered with a number of companies including the Research Institute for Innovation and Sustainability(RIIS), ZASPACE, Maxar, Airbus, the Innovation Hub Company, Technology Innovation Agency (TIA) to run successful South African and African Earth Observation Data (EOD) Open Innovation Challenges. The EOD Open Innovation Challenge is part of a broader strategy, involving industry, to:

- Grow Africa's Earth observation environment: Identify and empower the creation and use of downstream technologies and increase public awareness around the potential applications of space technology.
- Empower entrepreneurs: Inspire young Africans about new frontiers, discoveries and technologies and provide access to valuable training, market and investors.

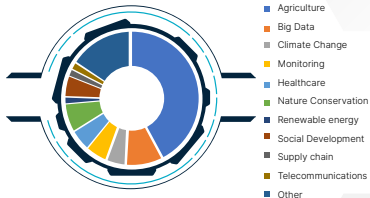
- Enable socio-economic development: Assist in the development of early-stage African businesses into sustainable companies that are linked to regional markets.
- Enable collaboration: Foster a collaborative culture between start-ups, organisations, industry experts, and support ecosystem players to boost knowledge and skills development.

The sixth edition of the Innovation Challenge, called the Africa Earth Observation Challenge, saw SANSA partnering with ZASpace, MAXAR, Amazon Web Services (AWS), Digital Earth Africa (DEA), the Global Entrepreneurship Network Space (GEN SPACE) and RIIS to run a six-week Africa wide challenge from 16 August - 30 September 2021. A total of 57 submissions were received from 17 different countries of which 14 were shortlisted as finalists to present their innovative use of Earth observation data to the programme partners in a virtual live pitching den.

1: OVERALL SUBMISSION BREAKDOWN

A total of 57 submissions were received from 17 countries.
These had various technology specifications and revenue changes

INDUSTRY



TECHNOLOGY SPECIALISATION

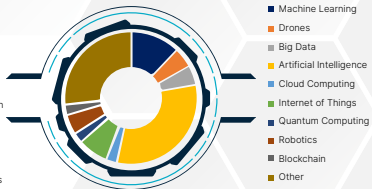


Figure 21: Breakdown of received submissions.

Africa Earth Observation Challenge

Country	No. of submissions
ANGOLA	1
BENIN	1
BOTSWANA	1
COTE D'IVOIRE	1
ETHIOPIA	3
GHANA	1
KENYA	7
MALAWI	1

Country	No. of submissions
NAMIBIA	1
RWANDA	1
SENEGAL	1
SOUTH AFRICA	23
SOUTH SUDAN	1
TANZANIA	2
ZAMBIA	1
ZIMBABWE	2

List of submissions received by country

FINALIST SUBMISSIONS OVERVIEW

14 submissions were shortlisted from South Africa, Zimbabwe, Zambia, Botswana, Malawi, Kenya, Nigeria and Rwanda



Figure 22: Breakdown of finalist submissions

TECHNOLOGY SPECIALISATION

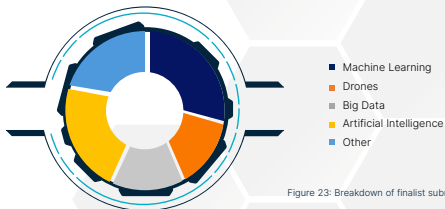


Figure 23: Breakdown of finalist submissions

FINALIST SUBMISSIONS OVERVIEW

Annual Revenue of Top 14 Finalists

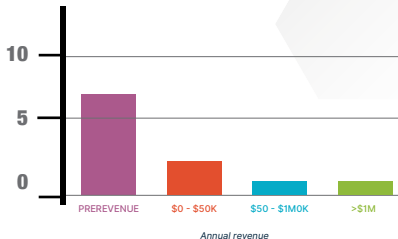


Figure 24: Breakdown of finalist submissions

The 14 finalists received business development training. Winners of the 2021 Africa Earth Observation Challenge were:

- 1st place: Astral Aerial Solutions (Kenya).
- 2nd place: Ijumaa Data Analytics, (Kenya).
- 3rd place: AgriSpace, (Zimbabwe)
- 4th place: Nyasa Aerial Data Solutions (Malawi), Ignitos Logistics (Zambia) and Aqualife Fisheries Farms(Nigeria).

The final pitching den and selection of winners

From the submissions that were received for the Challenge, the judges selected 14 finalists to present their innovative solutions to the virtual live pitching den. The event was live streamed to maximise marketing potential for the finalists and partners, and to publicly showcase innovations and investment potential in the space-technology industry.

From this event, the judges selected the following companies as the winners of the 2021 Africa Earth Observations Challenge:

- 1st place: Astral Aerial Solutions
- 2nd place: Ijumaa Data Analytics
- 3rd place: AgriSpaces
- 4th place: Nyasa Aerial Data Solutions
Ignitos Logistics
Aqualife Fisheries Farms



Screenshot of Ijumaa Data Analytics pitching virtually



Screenshot of Andiswa Miso, the keynote speaker, from SANSA

Figure 25: Africa Earth Observation Challenge Pitching Den and Winners

NEOFrontiers activities

The New Earth Observation Frontiers (NEOFrontiers) is an innovation funding mechanism established by the South African National Space Agency (SANSA) in 2021, in collaboration with the National Research Foundation (NRF) and with funding from the Department of Science and Innovation. The NEOFrontiers programme provides a collaborative yet competitive funding mechanism for developing strategic capabilities around new sensors, products and services, and value-added components. It seeks to stimulate collaboration, cooperation, and innovation in the public and private South African Earth observation community. SANSA and the NRF NEOFrontiers team have approved the NEOFrontiers projects to be funded from the 2020/2021 issued call. These include the following:

- Development of new high resolution water quality observation capabilities for coastal and estuarine systems (EO4WQ), consortia led by the

Council for Scientific and Industrial Research, with the SMME Cyanolakes representing the private sector, and DFFE and SAEON representing government.

- Earth Observation and Disruptive Economics: Developing Smart Tools for Value Enhancement for Small Scale Food Production, consortia led by the Agricultural Research Council, with the SMME Agrikool representing the private sector; and DALRRD Extension services and several rural development foundations representing government.
- Development of New Hyperspectral Capabilities across Aquatic, Atmospheric and Terrestrial Domains (HyperCAAT), consortia led by the University of Stellenbosch with SAEON representing government.
- Hyperspectral signal processing for Terrestrial, Aquatic and Atmospheric Applications (HysTAA) in South Africa, consortia led by the Council for Scientific and Industrial Research with DSI representing government.

This spread of projects will result in high impact outcomes – cutting edge hyper/multi-spectral development; in depth specifications for smart EO based farming for small scale farmers; new water quality capabilities for the Oceans and Coastal Information Management System; and an Artificial Intelligence EO roadmap. These projects will support 10 postgraduate students (six MSc and four PhD).

NEOFrontiers strategic direction and potential calls for 2022 was workshopped with the EO community on 2 December 2021. It attracted and was positively received by more than 75 registrants and 35 participants. Participating institutions and organisations included the DSI, Universities of Wits, Free State, Venda, Nelson Mandela, Limpopo, and KZN, Black Space Technologies, GeoTerralmage, Gemini GIS and Environmental Services, Cropwatch Africa, DALRRD, CSIR and Gauteng City-

Region Observatory, City of Johannesburg, amongst others. Information gathered in the workshop was used to optimise the NEOFrontiers 2022/2023 calls, published by the NRF in March 2022. The 2022/23 calls focus on climate change hazards, new infrastructure monitoring capabilities and postgraduate support around sensor validation and optimisation:

- Support Action SA/2022/1: Development of Climate Change Hazard Indices based on the Digital Earth Africa Platform.
- Support Action SA/2022/2: High resolution multi-sensor object-based detection for road network monitoring.
- Domain Development Action DDA/2022/1: Multi-Sensor Campaign Postgraduate Research and Development Support.

Space Infrastructure Hub activities

SIH: Thematic User Requirements

EO conducted nine Expert Advisory Group (EAG) meetings around the SIH user requirements in October. These were three-hour sessions with between six and 15 invited expert users, where mapping of the highest priority new missions, downstream services and new intelligence capabilities was possible. Experts represented a wide range of institutions including; security cluster (DoD, SAMSA, DFFE), Science councils (CSIR, ARC, Council for GeoScience), Industry (GTI), Government Departments (DFFE, DALRRD, DWS, DHS), and many universities. These EAG meetings were extremely valuable, and led to the formulation of a new integrated downstream model for the SIH business case and narrative (see Figure 26).

A further open community workshop on the User Requirements was conducted in January 2022. The aim of this workshop was to bring together the stakeholders and experts who participated in the interview and EAG sessions in order to gather any new insights and responses from industry players as well as to ensure the data collected from the interview and EAG sessions thus far aligns with the user requirements per thematic area. The invited stakeholders represented the broader community with over 80 community members from a wide variety of institutions involved in the consultation.

Critical components of SIH

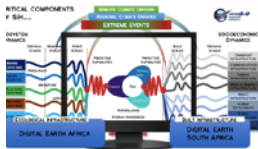


Figure 26: Schematic of the infraEco (infrastructure and ecosystems Earth Observation) downstream knowledge system.

The infraEco knowledge system has Smart front ends (centre of image) that provides users with a highly multi-thematic risk and vulnerability based decision support system. This intuitive, knowledge serving system integrates large volumes of synthesised EO products pertaining to both natural ecosystems (left), the built environment (right) and climate change effects at different scales. The system is intended as highly collaborative, modular in implementation and ownership, and strongly leveraging and contributing to existing and emerging information systems.

Research Productivity

SANSA EO researchers published nine papers in peer reviewed international publications, examining issues ranging from air quality, fire and methane emissions, covid impacts on agriculture and emissions, and forestry and agriculture services. A SANSA scientist

also edited a 165-page collaborative monograph for the International Ocean Colour Coordinating Group (IOCCG), entitled "Observation of Harmful Algal Blooms with Ocean Colour Radiometry". The monograph examines best practices for observing a wide variety of harmful algae across marine and fresh-water ecosystems, and makes a series of recommendations regarding sensors, algorithms, and realising ecological and operational value. This demonstrates the significant contribution that SANSA expertise is making to the international community through the IOCCG as a multi-agency organisation.

SANSA hosts the third AfriCultuReS user workshop

The South African National Space Agency is participating in the H2020 project, AfriCultuReS (Enhancing Food Security in African Agricultural Systems with the support of Remote Sensing)

funded by the European Commission under grant agreement number 774652. The aim of the project is to develop the Earth Observation (EO) based decision support system to support food security in Africa. SANSA is responsible for the development of livestock service which consists of rangeland (grazing and browsing) mapping and rangeland condition monitoring products.

The third AfriCultuReS User Workshop was held online on 22 February 2022 from the SANSA offices in Pretoria. The aim of the workshop was to report on the status and progress of the AfriCultuReS project, to demonstrate the EO platform and get user feedback to improve its services and to co-develop use cases for EO services with the South African user community.

A range of local stakeholders attended and participated actively in the group discussions. Stakeholders attended from various government departments, universities, research organisations, private EO/GIS companies, financial institutions and agribusiness companies. There is a huge emphasis on co-design and co-development of the platform with the users and therefore regular engagements with users such as workshops are required. The outcomes of the workshop included the list of use cases for various services and capacity development priorities.

The AfriCultuReS platform can be accessed through this link
<https://africultures-platform.eu/en/>

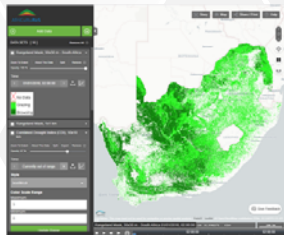


Figure 27: AfriCultuReS platform showing the rangelands map that was demonstrated in the workshop. The map shows where the grazing and browsing resources are.

Digital Earth South Africa (DESA) Project

DESA is a SANSA EO project that commenced in 2019. The key objectives of the project are: 1) turn raw high resolution satellite Earth observation data into actionable ready to use data; 2) DESA leverages Data Cube and Analysis Ready Data (ARD) technology to provide minimal effort access to SANSA's 30-year archive of SPOT high resolution Earth observation data and 3) also allows governments, scientists, businesses and citizens to efficiently produce and use Earth observations to provide insights for society's most pressing challenges.

The key milestones achieved (2021/22) are as follows:

- Successfully procured, deployed and configured the HPC cluster at the Hartebeeshoek Earth Observation Data Centre (EODC)
- Successfully designed and deployed the storage solution and architecture
- Successfully installed the Open Data Cube
- SANSA personnel trained to operate the data cube software (Open Data Cube)
- SANSA personnel trained to operate the storage solution
- Successfully demonstrated the Human Settlement Product

Digital Earth South Africa team undertook a demonstration activity on 7 December 2021. This was a demonstration of all the components involved in the DESA platform from the high performance hardware, the Analysis Ready production, the human settlement product and

lastly the front end that external users would use to interact with the system.

The team has managed to successfully produce Analysis Ready Data for the Gauteng Province. The next steps are kubernetes deployment, user access and user testing. The team is now getting geared up for the official launch of DESA planned to take place in April/May 2022.

Digital Earth Africa's office set to amplify the value of Earth Observations for the continent

SANSA was appointed as the Digital Earth Africa (DE Africa) Program Management Office host in August 2021. SANSA's role includes running the operations of the technical platform.

DE Africa's eco-system of stakeholders includes governments, space agencies, the private sector and civil society across Africa and internationally, who all play a role in ensuring that vital global Earth Observations continue and that the data are analysis-ready, rapidly available and readily accessible.



Figure 28: PMO launch event hosted by the Australian High Commission in Pretoria

A fundamental aspect of the establishment of DE Africa is ensuring that it's fully operational in Africa, further strengthening the ability to respond to the unique needs of African users.

SANSA hosting the Program Management Office reflects the transition of DE Africa to be owned and run by African organisations and stakeholders.

The program management staff and the team will be in place by 1 June 2022. DE Africa will improve lives across the African continent by translating Earth Observations (EO) into insights that will support key Sustainable Development Goals.

DE Africa provides access to the following platforms:

The DE Africa Map

- This is a website for map-based interaction with DE Africa products and services.
- The map equips users with tools to explore data and products and visualise the continent using satellite imagery.

The DE Africa Sandbox

- This sandbox is a cloud-based computational platform that operates through a Jupyter Lab environment.
- It provides a limited, but free computer resource for technical users and data scientists to explore DE Africa data and products.
- Users can access remote-sensing data and analysis tools for ad-hoc report generation and the rapid development of new algorithms.

Notebook Repository

- This repository of readily available user computational workflows and code will allow users to use, interact and engage with the DE Africa Sandbox.
- The repository will grow continuously as new notebooks are developed by the DE Africa team and the user community.

To support the uptake of its products and platforms, DE Africa provides a range of training and assistance. There's a help desk with valuable materials such as articles, FAQs and User Guides, and a self-paced short course designed to help users work autonomously with the data analysis platform. The DE Africa training has been upgraded in 2021 and it can be accessed at: <https://learn.digitalearthafrika.org/>

Availing earth observation data for decision making across the continent

Digital Earth Africa makes Earth EO data readily available, delivering decision-ready products to the African continent. Creating value through free and rapid access to information, DE Africa will support the ability of policymakers, scientists, the private sector, and civil society to innovate in addressing social, environmental, and economic changes across the continent and respond effectively to sustainable development challenges.

EO data is a valuable resource that will enable the achievement of the UN's Sustainable Development Goals and the AU's Agenda 2030 mandate. Scientists are currently using DE Africa to monitor changes to Lake Chad, enabling them to assess water quality and its impact

on the countries that rely on the lake for their socio-economic livelihoods. Through DE Africa, the mapping and monitoring of changes can inform decisions on managing water supply.

Partnerships will support DE Africa's operations with African governance and in-country expertise. In addition to SANSA's support, five key strategic partnerships have been strengthened between DE Africa and EO organisations.

The partnerships are with

- AFRIGIST (Nigeria),
- AGRHYMET Regional Centre (based in Niger),
- RCMRD (Kenya),
- CSE (Senegal) and
- OSS (Tunisia)
-

These partnerships cement a commitment to sustainable relationships and a complete transition to African operations.

DE Africa Services

New operational services were released in 2021. DE Africa services are designed to target critical information needs with reliable and ready to use outputs.

Water Observations from Space (WOfS)

provides historical and current information on presence or absence of water and where inundation has been observed by satellites. With data from 1984, WOfS can be used to understand flood risk and climate impact, and to inform policy decisions around water resource management. In 2021 WOfS progressed from a provisional to an operational service.

Cropland Extent Map shows the presence or absence of crops in 2019 for Eastern, Western, Northern and Sahel regions of Africa, with development of the remaining areas of the continent underway. The service helps users understand the footprint of crop growth across Africa and is expected to underpin models of

crop productivity, crop types or watering intensities.

Fractional Cover provides a measurement of ground cover directly related to processes of plant growth, agricultural production and land degradation. Fractional cover estimates the proportion of bare earth, green (photosynthetic) vegetation and non-green (dry) vegetation cover at each point (pixel) on the Earth's surface, enabling users to understand patterns in the condition and extent of vegetation from 1984.

GeoMAD condenses satellite images from each year or six month period into a high quality representative view of the ground cover during the time period. Available at 10 meter resolution from 2017 (annually and semi-annually) and 30 meter resolution from 1984 (annually), it is a powerful tool for visualising and analysing annual and seasonal changes.

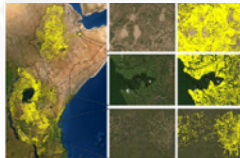


Figure 29: Crop probability in Eastern Africa shown by DE Africa's cropland extent map service

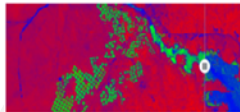


Figure 30: Fractional Cover over agricultural areas in Mozambique viewed on the DE Africa Map (maps.digitalearth.africa), highlighting areas of cropping in green. Large areas of red indicate that the ground is often bare in those areas

PROGRAMME 3: **SPACE SCIENCE**

Space Science Programme (SSP) leads multi-disciplinary space science research and development. Key functions include, fundamental and applied space science research, the support of space-facilitated science through science data acquisition, coordination and management of scientific data ground segments, provision of space weather and other geo-space and magnetic technology products and services.

These products and services are provided on a commercial and private basis to the defence, maritime, communications, aviation and energy sectors. The programme also provides leadership in post-graduate science and engineering student training as well as science advancement including both learner and educator science support.

PROGRAMME OUTPUTS

The core outputs of the Space Science Programme include:

- Installing and maintaining infrastructure for operational services and for R&D,
- Generation of knowledge to advance our understanding of the solar terrestrial environment,
- Development of products and services in accordance with the requirements of our clients,
- Development of human capital to advance the above and meet the skills need of the country,
- Advancement of science amongst the youth and the public,
- Development and maintenance of international partnerships, and
- Participation in international for such as in the United Nations and International Civil Aviation Organisation (ICAO) related Committee meetings.

The outcomes expected from realising these outputs are:

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

PROGRAMME 3: PERFORMANCE AGAINST 2021/2022 OUTPUT INDICATORS AND TARGETS

Space Science Programme

Outcome	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O1 Increased - space relevant knowledge that supports the developmental agenda	O1.2.1 Awareness and training interventions to key users of space-based products and services	O1.2.1.1 Number of awareness and training interventions to key users of space-based products and services	3	4	+1	Annual target exceeded due to additional awareness and training interventions sessions held
O3 Increased human capacity for the implementation of key space initiatives	O3.1.1 Increased youth awareness of science	O3.1.1.1 Number of youth directly engaged	5,000	8,064	+3064	Target was exceeded due to a number of science engagement activities that were requested by schools as well as the Space Clubs
	O3.2.1 Support to students and interns	O3.2.1.1 Number of students and interns supported for formalised training	21	26	+5	A successful recruitment drive resulting in additional students

Outcome	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O4 SANSA re-positioned as a key enabler of government's space-related policies	O4.2.1 Significant benefit for the space programme through partnerships	O4.2.1.1 Number of activities initiated through formal International partnerships	3	13	+10	Activities with international partners has increased due to the Operational Space Weather project
		O4.2.1.2 Number of activities initiated through formal African partnerships	3	6	+3	Activities with African regional partners have increased now that travel has resumed, and also due to the Operational Space Weather services project
		O4.2.1.3 Number of activities initiated through formal National partnerships	3	10	+7	Additional national partnerships have been actively pursued to ensure a national programme of activities.
O5 Appropriate infrastructure developed to support the local space sector	O5.1.1 Proportional progress towards an operational space weather centre	O5.1.1.1 Percentage progress towards a new operational space weather centre, as per an approved Business case	70%	70.1%	+0.1%	Annual target met

Outcome	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O6 Increased share of the global space operations market	O6.2.1 Applications to address society's need and challenges	O6.2.1.1 Number of products and applications	2 (Space Weather/ Magnetic Technology products and services as per client requirements)	2	No variance	Annual target met
	O6.3.1 Increased national space research output	O6.3.1.1 The national research productivity score for space supported R&D	1 000	1,287.63	+287.63	The target was exceeded due to high impact journal publications as well as the high number of rating applications

Table 6: Space Science Performance

PROGRAMME 3: KEY ACTIVITIES / ACHIEVEMENTS FOR THE 2021/2022 FINANCIAL YEAR

The Space Science Programme had nine key performance indicators due for delivery and reporting at the end of the 2021/22 financial year and nine (i.e. 100%) of these targets were met.

Research

A key ongoing activity within SANSA is fundamental and applied space science research primarily aimed at growing the knowledge economy and providing the foundation on which to build innovative applications that contribute towards the nation's industry. SANSA researchers are investigating all aspects of the near-Earth space environment from the background plasma to the impact that solar storms can have on ground and space based technological systems. This research is important as it grows the knowledge economy, develops a credible expert base, and provides the knowledge foundation that assists in

protecting technology on Earth such as power grids, communication, and navigation systems. The impact of SANSA's research is measured through a research productivity score which encompasses high impact internationally reviewed journal papers, contributions to expert textbooks, research rating of individual researchers and the number of research students graduated through this programme. The total research productivity score for the Space Science Programme for the 2021/22 year is 1 283, which exceeds the target of 1,000 by 1,283, demonstrating a highly productive research team.

SANSA Chief Scientist, Prof Michael Kosch, has been honoured for a 2020 published paper by the Operations Research Society of South Africa. The paper, co-authored by Prof Kosch, is entitled "Decision support for the selection of optimal tower site locations for early-warning wildfire detection systems in South Africa" and received the 2021 Tom Rozwadowski Medal. This medal is the Society's premier award and has been awarded on an almost annual basis since 1971. The medal is awarded for the best written contribution to Operations Research made by a member of the Society during the previous year.

Space Weather Project

With funding support provided by the Department of Science and Innovation (DSI), the 24/7 Operational Space Weather Services Project is on track towards completing the business case objectives by October 2022. By financial year end, 70% of the project has been completed. The Hermanus Facility has been a hive of construction activity during the past financial year with many renovation and building projects taking place concurrently.

Construction of the operational Space Weather Centre is near completion and the end of this phase of construction was marked by the construction office being moved from the Space Weather Centre to the Student Residence where the next phase of construction will take place.



Figure 31: The Space Weather Centre is near completion with final touches being implemented and furniture moved in

A new 315kVA, LEROY SOMER brushless synchronous generator was successfully installed inside the newly built generator house on the Hermanus campus. This generator capably produces three times the output of the previous unit in order to provide backup power generation to all the structures at the SANSA Hermanus facility. The switch over of the campus to the new generator and transformer took place on 10 March 2022, with an

extensive Electro-Magnetic Interference (EMI) measurement campaign taking place on 24 March 2022. The conclusion is that the generator behaves as it should without unwanted influences on the magnetically clean environment of its new home.

Training of the four new Space Weather Forecasters continued throughout the year with a highlight being media training which had a practical component when they were engaged in a Twitter-Space panel discussion with the Deputy Minister. Stakeholder engagements relating to the project have continued throughout the quarter with SANSA participating in several national, regional and international forums directly related to the space weather project including the ICAO Met Panel Space Weather Centre Coordination Group (SWCCG) meetings, the Pan European

Consortium for Aviation Space weather User Services (PECASUS) meetings, the Advisory Committee for Aeronautical Meteorological Services (ACAMS) quarterly meetings, and the ICAO Met Panel Working Group on MET Cost Recovery Guidance and Governance (WG-MCRGG). The World Meteorological Organisation (WMO) Expert team on Space Weather (ET-SWx) has been established to lead the delivery of the space weather related research to operations and stakeholder engagement activities of WMO in close coordination with the relevant WMO bodies.

A SANSA representative has been nominated to co-chair this expert team of approximately 30 experts representing all areas of the globe. These engagements are critical for ensuring that consistent globally recognised mechanisms are put in place for providing the required space weather

information to the aviation sector, that awareness of the requirements for space weather information is created within the African Region, and that South Africa, through SANSA, retains its status as a leading player in the global challenge of space weather.

The SANSA Hermanus Facility has achieved ISO 9001:2015 certification for its products and services. The adoption of a Quality Management System is a strategic decision for SANSA to deliver quality products and services from the specialised facility in Hermanus. Over the past three years the team have been preparing each business unit and setting up systems to ensure that certification is possible. The team successfully passed the stage 2 audit in February 2022 and the ISO certificate was issued on 28 February 2022.



Figure 32: A significant milestone in achieving ISO 9001: 2015 certification for the SANSA Hermanus Facility

Marion Island

The 78th Marion Island Expedition departed Cape Town on 9 April 2021 and arrived safely at Marion Island on 13 April 2021. The SANSA team included the new overwintering engineer, DJ Van Wyk, and SANSA volunteer and environmental scientist, Jessica Verheul. In light of the COVID-19 pandemic, the voyage was authorised to proceed

with strict protocols in place, including a mandatory quarantine period of 14 days and COVID-19 testing for all the participants. During the relief period, the team focused on a magnetic gradient survey of the science area in anticipation of the installation for a new magnetometer in partnership with GFZ in Germany. Maintenance was performed on third-party hosted instrumentation including the Tide Gauge project, which forms part of the International Tsunami Early Warning System; the DORIS beacon, which helps satellites stay in orbit; and the RIOMeter, which measures ionospheric opacity and the seismometer.

The team also conducted preventative and corrective maintenance on all SANSA instrumentation located in and around the Marion Island base.

Despite harsh weather conditions, the team was successful in the completion of their planned tasks. The returning overwintering engineer, Stephanus Schoeman arrived safely back in South Africa on 12 May 2021. The teams at Marion Island and at the SANAE Base in Antarctica also celebrated midwinter on 21 June 2021.

Antarctica

SANSA is participating in the annual relief voyage to Antarctica that departed Cape Town on the SA Agulhas II on 4 December 2021. Due to COVID-19 restrictions, SANSA had to limit its number of participants to only the two 2022 overwintering team members, Thobani Mabaso and Mfezeko Rataza, who had to endure intense training and

14 days of quarantine in Cape Town before embarking the SA Agulhas II for the three-week journey to the Ice. The team will spend the austral summer attending to maintenance and upgrades of SANSA's instrumentation network and preparing for the long Antarctic winter season. SANSA's 2021 overwintering engineers, Matthew Spoor and Christopher Gray, who spent 14 months in Antarctica during 2021, returned to South Africa on 2 February 2022. General maintenance, fault-finding and repairs were performed on the Digital High Frequency (HF) Radar arrays, the VLF system, and the magnetometer systems as well as routine summer maintenance on the equipment infrastructure and the recovery and repatriation of data for the year. The Antarctic station is a key data collection point for SANSA's research and operational objectives. The two 2022 overwintering engineers remained in Antarctica and will be maintaining SANSA's instrumentation for a period of 12 months.

Balloon Launch

The SANSA researchers and students launched a research balloon on 4 June 2021. The launch took place on site at the Hermanus campus, after which the team drove for approximately three hours before recovering the payload near Anysberg Nature reserve in Touws River, about 200km from Hermanus. The balloon was launched by releasing a helium inflated weather balloon carrying a payload which consisted of a handheld personal radiation dosimeter to estimate atmospheric radiation and a communication device for ease of retrieval. The communications device allows the location coordinates to be transmitted back to the team enabling easier tracking of the position of the balloon. The payload was successfully recovered. This activity is significant to generate knowledge with respect to atmospheric radiation at aviation altitudes.



Figure 33: The 2021 SANSA Overwintering Engineers have returned safely after completing a successful voyage to Antarctica.



Figure 34: SANSA Researchers and students preparing for the launch of a weather balloon for measuring atmospheric radiation

Geomagnetic Working Group

The SANSA Hermanus Facility is a magnetically clean environment built on 81 years of expertise and development. Recently, as part of the bid to protect and preserve the environment as SANSA grows, a decision was taken to establish a Space Science Geomagnetic Working Group (SS-GWG). This working group was created to improve operational efficiency and communication between the various business units within the Space Science Programme that are users of the geomagnetic observatory resources and/or responsible for the upkeep of the magnetically clean area. It has been recognised that a key part of SANSA's business stems from the fact that the Hermanus Facility is a magnetically clean facility, and any degradation of this status would be

detrimental to SANSA's business. An action item from the SS-GWG was to conduct internal in-house training on Gradient Survey measurements, resulting in several team members being trained during quarter 4. Developing this capability in-house allows the SANSA team to take responsibility for preserving the magnetically clean environment through knowledge and understanding of the potential impacts.

International Collaboration

SANSA in collaboration with Stellenbosch University and the Czech Technical University in Prague recently installed two new Superconducting Quantum Interference Devices (SQUIDs) - a National Instruments Data Acquisition instrument and a low noise CTU fluxgate magnetometer. This equipment was partially funded through the IEEE

Magnetics funding. Michal Janosek and Michal Dressler, both from the Czech Technical University in Prague are collaborators on the IEEE Magnetics funding proposal. Michal Dressler visited SANSA for five months in 2021 on a research grant to work on the SQUID project as well as his PhD. His supervisor, and SANSA collaborator, Michal Janosek visited for three weeks specifically to



Figure 35: Training on gradient survey measurements took place at the SANSA Hermanus campus

assist on the SQUID project. In addition to the instrument installation, data acquisition and user software were also upgraded. Ongoing evaluation of the new instruments as well as tuning and calibration is still in process, as well as continual upgrade of the software. This is an important upgrade to the SANSA Research Data platform.

Magnetic products and services

SANSA works closely with players in the local space industry to source and calibrate magnetic sensors for integration on board dynamic platforms such as satellites and Unmanned Aerial Vehicles (UAVs or drones). SANSA's facilities in Hermanus include specialised instrumentation within the magnetically clean environment that can characterise and calibrate magnetic sensors, as well as identify the magnetic signature

of dynamic platforms prior to sensor integration. SANSA is recognised as a national expert in various magnetic technology applications. During the 2021/22 financial year, SANSA calibrated 121 compasses for the private aviation sector, and provided magnetic test and evaluation services on 131 satellite torque rods and 60 space qualified magnetometers.

Marketing

SANSA is in the process of adopting a market-driven strategy for the Space Science Programme, with the core objective of delivering superior customer value. The underlying logic of a market-driven strategy is that the customers who form the market should be the starting point of the business strategy. In a market-driven strategy, the customer is the focal point of an organisation's

total operations. Customer centricity and the management of customer relationships is also an important focus point of ISO 9001:2015, which was awarded to SANSA Hermanus in quarter 4. Therefore, all team members underwent training to prepare for the customer orientated approach that the organisation will be adopting. The training has assisted the team in understanding the requirements for delivering superior customer value and how to successfully deploy their skills and resources to satisfy customer needs.

Two Market Positioning workshops were conducted during the 2021/22 financial year. Marketing and business development are key activities of the Space Weather Project. The goal is

to ensure that products and services developed for the Space Weather Centre are being adopted by the market and thereby fundamentally contributing to the sustainability of the facility.

A newly created marketing strategy was approved in February 2022 to align the marketing and business development activities with the goals of the Space Weather Centre. This marketing strategy is necessitated through the economic requirement for the SANSA Hermanus facility to become more commercially focused, and actively market the products and services available through the Space Science Programme. This strategy is an outcome of the Space Science Strategic Plan that calls for a strategic approach to marketing and business development. The marketing

strategy aims to shape the future of marketing space science products and services. Implementation of the marketing strategy has commenced.

Ionospheric Characterisation Analysis and Predication (IOCAP) Tool

IOCAP is an innovative High Frequency Communications prediction tool with an exceptionally user-friendly interface. The popularity of this product has grown over the past financial year with more defence clients adopting the use of IOCAP as part of their operations. IOCAP has also been quality assured by ARMSCOR after a three-day audit of the software tool and its capabilities. This allows even more role-players in the defence sector to purchase the software licence for IOCAP.

SANSA SARCHI Research Chair in Space Weather

2021/22 saw the arrival of SANSA's first South African Research Chair Initiative (SARCHI), a collaborative initiative between SANSA, the Department of Science and Innovation (DSI) and the National Research Foundation (NRF) that was three years in the making. Dr Martin Snow joined SANSA on 1 April 2021 from the Laboratory for Atmospheric and Space Physics in Boulder, Colorado in the USA. His speciality focus is in Solar Physics and the primary aim of the Research Chair in Space Weather is to fill this gap in expertise within the SANSA team.

The SANSA SARCHI Research Chair in Space Weather, Dr Martin Snow, was appointed as an Extraordinary

Professor in the Department of Physics and Astronomy at the University of the Western Cape (UWC) with effect from 1 September 2021. UWC will be SANSA's main academic partner for the Research Chair, and initiatives are underway for space weather and solar physics to become embedded as project options for students.

Dr Snow participated in several events to increase awareness around space weather and its associated risks. The engagements included several webinars and speaking opportunities at conferences and universities. Dr Snow was chosen as a panellist on the topic of Adapting and Applying Space Technology for the Benefit of Africa during the recent African Space Generation Workshop (AF-SGW). He also took part in the 1st IAA African

Symposium on Small Satellites that took place from 29 November to 1 December in Stellenbosch.

Dr Snow was accompanied by Juchelle Ontong (Student Administrator) and Robert Daniels (Communications Officer) on a tour of the Gauteng Triangle universities including the University of Pretoria (UP), University of Johannesburg (UJ) and University of the Witwatersrand. The team then attended the Potchefstroom campus of North-West University and completed the tour at SANSA Hartebeeshoek.

After the tour of Gauteng and North-West, the team visited the University of the Western Cape (UWC). At the Universities, the team met with students and their faculty advisors, building partnerships that will lead to solar

physics student projects at all levels. At UP, discussions were held with the Dean of the Faculty about turning the Gauteng Triangle into a diamond by adding SANSA as a node of their Big Data partnership.

The students at UJ were especially interested in the solar physics projects, and they had some great questions about how to distinguish solar energetic particles from galactic cosmic rays, and why solar irradiance needs to be measured from space instead of from a telescope on the ground. Dr Snow's talk at UWC was well attended and a bigger venue had to be identified to accommodate all the interested students. The possibility of adding a space science module (with focus on space weather) to the curriculum was discussed.



Figure 36: SANSA team members promoted Solar Physics on a roadshow to Gauteng and North-West provinces

International Partnerships

SANSA Hermanus hosted a senior academic management delegation from the Botswana International University of Science and Technology (BIUST) in February 2022. The main purpose of the visit was to identify possible future partnerships and opportunities for both parties. The delegation was led by the BIUST Chairperson, and included the Vice-Chancellor and the Deputy Vice-Chancellor Research, Development and Innovation. In return a SANSA delegation travelled to Botswana in March 2022 to identify possible locations for hosting SANSA instruments as part of the African Instrumentation Network, a Space Weather sub-project. Two GNSS instruments were installed in Botswana during that visit, and numerous potential collaboration opportunities identified. SANSA is looking to host a permanent magnetic observatory for commercial returns in Botswana in the future.

Two representatives from the United Kingdom Space Academy spent three days at SANSA Hermanus to discuss how they can support SANSA's Science Engagement initiatives. The visitors were given a tour of the SANSA facility and treated to famous South African hospitality. After two full days of presentations and discussions a plan was drafted on how the two entities can support and learn from one another. The visit ended on a high note when Anu Ojha, United Kingdom Space Academy Discovery Director and Lorna Lewin International Manager visited Qhayiya Secondary School in Hermanus, armed with an infrared camera, a high-pressure space suit and a Mars and a Moon rock. SANSA looks forward to working closely with the United Kingdom Space Academy to help inspire the youth through science and technology.



Figure 37: Anu Qjha, United Kingdom Space Academy Discovery Director at Qhayiya Secondary School in Hermanus

National Partnerships

SANSA and Air Traffic Navigation Services (ATNS) signed a Memorandum of Understanding (MoU) in October 2021 to increase cooperation between the entities. The MoU, which is a renewal of the previous MoU aims to strengthen the dynamic, integrated management of air traffic and airspace with specific reference to the operational and technological developments and alignment to international requirements in the field of aviation. The areas of cooperation covered by this MoU include Magnetic Variations and the World Magnetic Model (WMM), HF Communications, space weather, GNSS and Digital Terrain Data and Satellite Imagery and signal integrity Monitoring of GNSS. ATNS is a primary partner in the Operational Space Weather services project.

The African Instrumentation Network

The African Instrumentation Network Project has reached several new milestones as talks with African counterparts on hosting agreements yield positive results. A SANSA GNSS station has now been installed at the University of Lagos, Nigeria. Two GNSS reference stations were also deployed in Letlhakane and Palapye in Botswana in March 2022. These GNSS station deployments form part of the African Instrumentation Network that will improve data coverage and accuracy over the African Continent. This in turn will assist in providing Africa with an even better space weather forecasting service. Uganda has also agreed to host an instrument and a suitable site has been selected. Meetings with Ethiopia, Rwanda and Egypt have opened up new opportunities for possible hosting agreements with those countries.

Hackathon

SANSA hosted the first space weather Hackathon in August 2021. The Hackathon challenged participants, mostly students, to pitch a proposal for a space weather related application to a panel of expert judges. The participants were mentored by SANSA researchers during the 24-hour challenge. The four SANSA Hackathon 1st place Winners, Nicole Oyetunji, Irene Nandutu, Kamvalethu Vanqu and Daisy Mangu were treated to a space industry tour on Thursday 18 November 2021 which formed part of the 1st place prize. The team visited NewSpace Systems in Somerset West, Cube Space Custom ADCS Solutions in the Stellenbosch CBD, and Dragonfly Aerospace in Technopark, Stellenbosch. In addition, the winners were also taken on an extensive facility tour of the SANSA Hermanus Campus where they engaged with SANSA team

members. The highlight of the tour was a presentation given to SANSA by the winning team on their ideas for developing space weather applications.

On 4 August 2021 SANSA hosted Generation Schools for a MoU signing ceremony in the Space Weather Centre in Hermanus. The relationship between SANSA and Generation Schools was initiated in 2020 when a meeting took place to discuss potential collaborations primarily in science engagement activities. In this meeting several opportunities for collaboration were identified and it was decided that the partnership should be formalised in a MoU. The MoU's areas for collaboration includes science competitions, science outreach programmes, development of mobile science centres, assisting in the development of science curriculums and exchange of information and expertise.



Figure 38: SANSA Space Weather Hackathon Winners enjoyed a tour of the Western Cape Space Industry when they claimed first prize



Figure 39: SANSA Managing Director and Generation Schools CEO concluding the signing of a joint MoU

PROGRAMME 4:

SPACE OPERATIONS

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

PROGRAMME OUTPUTS

The core outputs of the SOP are as follows:

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

The outcomes expected from realising these outputs are:

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

PROGRAMME 4:

PERFORMANCE AGAINST 2021/2022 OUTPUT INDICATORS AND TARGETS

Outcome	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O6 Increased share of the global space operations market	O6.1.1 Rand value of income generated from space operations activities	O6.1.1.1 Total income generated from space operations activities	R69 million	R82.3 million	+13.3 million	Year-to-date target exceeded due to completion of projects that were affected by Covid-19 and targeted marketing
	O6.2.1 Applications to address society's need and challenges	O6.2.1.1 Number of products and applications (Space Operations products and applications)	1	3	+2	Target exceed due to new clients secured
	O6.4.1 Greater benefit for the space programme through space operations activities	O6.4.1.1 Successful satellite pass monitoring rate for Earth Observation	98%	99.76%	+1.76%	Target exceeded due to good maintenance and Capex replacements

Table 7: Space Operations Performance

PROGRAMME 4:

KEY ACTIVITIES / ACHIEVEMENTS

FOR THE 2021/2022 FINANCIAL YEAR

The year under review ended on a high for the Space Operations Programme with the wrap up of multiple projects for regular SANSA customers.

Deep Space Complex

Records would show that South African National Space Agency (SANSA) and National Aeronautics and Space Administration (NASA) engaged as early as 2014 to consider the possibility of a Deep Space complex in South Africa. Matjiesfontein (MTJ) was identified as a suitable site to host a ground station for Lunar missions and deep space explorations. This was followed by a study to investigate the technical, environmental, and operational feasibility of establishing and hosting a space vehicle tracking and communications ground station in South Africa.

The MTJ site was compared to other candidate sites and analysed on its technical suitability and was found to satisfy the maximum requirements for the establishment of a new ground station, considering the future development in ground to space communications. The installation of the MTJ ground station will be an opportunity for South Africa to enter the international space exploration missions, improving space operations capabilities and offerings.



Figure 40: Matjiesfontein site

Investments of this nature are long-term investments as these programs typically have a lifespan of 30 to 40 years.

Owing to the above, MTJ ground station is a special project that SANSA remains optimistic about. The MTJ business case compliments the ground station business case for the SIH and has as its focus the implementation of support and services for Lunar mission antennas and deep space antennas. As a result, SANSA is confident that discussions with relevant bodies in the 2022/23 financial year will advance the planning and implementation of this project. There is also a growing international interest in this site as it is perfectly placed and prescribes to all the specifications.

Ksat/OneWeb

The Satellite Network Portals (SNP)-16 project which involved the installation and testing of 19 antennas for the OneWeb constellation has taken all but two years to complete. The installation and verification of the antennas as

well as the installation and testing of all other customer-supplied equipment were completed to the client's satisfaction.



Figure 41: Ksat /OneWeb

New Projects

SANSA was awarded two contracts which are currently in the design phase. The first contract entails a 13m C-Band antenna with complete hosting facility. The time scale for operations is June 2022. The second contract involves a ten-year hosting agreement which includes the establishment of a new site and installation of a 7.3m antenna with an option to expand to a 4-antenna facility.

Launches

Despite the world-wide pandemic that caused a major slow down in the launching and building of satellites, SANSA managed to supported 17 launches for the financial year as listed in Table 8.

Support	Completion Date	Support Days	Type	Customer
GOES-T	11/03/2022	10 DAYS	TOSS	SSC
TURKSAT-5B	26/12/2021	8 DAYS	TOSS	INTELSAT
F9 TURKSAT-5B	19/12/2021	1 DAY	LAUNCH	KSAT
GALILEO 223 & 224	05/12/2021	2 DAYS	LAUNCH	CNES
MMS DECEMBER	02/12/2021	2 DAYS	LEOP	SSC
MMS NOVEMBER	30/11/2021	2 DAYS	LEOP	SSC
F9 DART	24/11/2021	1 DAY	LAUNCH	SPACE X
Q-1R	27/10/2021	2 DAYS	TOSS	TELESAT
AIRBUS QUANTUM	08/08/2021	8 DAYS	TOSS	INTELSAT

Support	Completion Date	Support Days	Type	Customer
NIMIQ-2	05/08/2021	95 DAYS	SUPPORT	TELESAT
N2 KA PLOTTING	02/08/2021	8 DAYS	SUPPORT	TELESAT
MMS JULY	31/07 2021	1 DAY	LEOP	SSC
SXM-8	13/06/2021	6 DAYS	TOSS	INTELSAT
F9 SXM-8	06/06/2021	1 DAY	LAUNCH	KSAT
TURKSAT-5A	06/05/2021	11 DAYS	EOR	INTELSAT
GOES 13	19/04/2021	8 DAYS	DRIFT	SSC
MEV-2	12/04/2021	44 DAYS	DRIFT	INTELSAT
MTable 8 : SANSA Launches for 2021/22C				

GOES-T

Another exciting launch support was provided for GOES-18 aka GOES-T, a new satellite within the current generation of weather satellites operated by the USA's National Oceanic and Atmo-spheric Administration (NOAA). The current and next satellites of the series will extend the availability of the Geostationary Operational Environmental Satellite (GOES) system until 2037.

GOES-T is the third in a series of four spacecraft in NOAA's current generation of weather monitoring satellites in geostationary orbit. NOAA's GOES tracks hurricanes, severe storms, wildfires dust storms, and other weather events in real-time, giving forecasters a minute-by-minute glimpse of evolving conditions.

The satellite was launched from Cape Canaveral on 1 March 2022 from an Atlas V. It was built by Lockheed Martin and

is based on the A2100A satellite bus which will have an expected useful life of 15 years.

SANSA provided S-band transfer-orbit support (TOS) to the Swedish Space Corporation (SSC) during the first nine days of the mission, most of which was nominal.

The satellite on the other hand, experienced an automatic engine shut down that consequently aborted its first major post-launch manoeuvre, whilst moving toward its operational geostationary orbit. The cause of the anomaly was identified and resolved, and the satellite is reported to not be in any danger nor did it experience any damage. GOES-T successfully resumed orbit-raising with a main engine burn on 05 March 2022.

Galileo

SANSA provided 2 days support to Galileo satellites 27 and 28 which were launched on-board Soyuz VS-6 carrier, operated by Arianespace and commissioned by European Space Agency from Spaceport in French



Figure 42: Galileo satellite lift off

Guiana. These two satellites will join the European satellite navigation system at an altitude of 23,222 kilometres.

Galileo is a global satellite navigation system that consists of a "space segment of 30 MEO satellites in 3 planes inclined at 56°"; "launch segment to place the satellites into their operational orbits"; "control ground segment for monitoring and control of the satellites"; "mission ground segment managing all mission specific data" and "user ground

segment of equipment capable of receiving and using Galileo signals".

Galileo's satellite constellation "transmits precisely shaped and timed signals, down through the atmosphere, reflecting back from Earth's land, seas and ice and extending far out into space, as far as the Moon".

Challenges: Euro-Diesel generator

In early April 2021, Space Operations experienced a major and unforeseen failure of the 1000Kva Euro-Diesel generator, which is the prime power back-up to the HBK site, due to an irreparable damage to the generator's engine.

For many years, the 1000Kva Euro Diesel generator provided autonomous and uninterrupted back-up electricity to HBK facility hence this failure was considered a major operational risk. A specialised

team was immediately mobilised to expeditiously mitigate the risk, while working to fully restore the back-up electricity capability and capacity. A standby generator was rented within eight days while a new engine was being sourced. The installation of the new motor 1250 Kw and the balancing of the Euro diesel was completed within three weeks and has been operating successfully. SANSA was able to continue uninterrupted and excellent service to client amidst this catastrophic incident.

Achievements

Earth Observation Pass Statistics

The Space operations team overall achievements reveals the delivery beyond performance targets and metrics in all areas. This can be attributed to the excellent and consistent performances

of the operations and technical personnel in operating and maintaining the antenna and ancillary systems as well as infrastructure required to facilitate the service.

The table below highlights scheduled and tracked satellite overpasses for SANSA . The overall proficiency score for the 2021/22 financial year is 99.76%.



Figure 43: Installation of the Generator

FY2021_22	No. passes scheduled	No. of passes successful	Total mins of data recorded	Total mins of data lost	% reliability
Q1	3,151	3,081	31,684.51	197	99.38
Q2	3,289	3,220	33,561.25	11.73	99.97
Q3	2,954	2,944	30,408.6	6.75	99.98
Q4	2,838	2,826	29,667.91	79.13	99.73
TOTAL /AVERAGE	12,232	12,071	125,322.27	294.61	99.76

Table 9: Scheduled and tracked satellite overpasses for SANSa

Information Communication Technology

SANSa successfully completed the migration of its internet services from Brilliantel to EOH Network Services on 01 November 2021. The internet bandwidth was also upgraded from 300Mbps to 1200Mbps.

There were 1,195,672 total attacks on our network, 6,063 (0.51%) of them were considered high impact.

There was no successful network breach despite the targeted cyber-attacks experienced in early September 2021. The network availability of critical systems and customers on our dark fibre and MPLS network is 100%. Giving customers an excellent service.

Improving reliability of existing infrastructure

The upgrade of the MPLS network between SANSA Teraco has been completed and is fully operational. We installed 6 additional routers to provide full redundancy and automatic link failover after link outage. The MPLS failover configuration is aligned with our objective “to improve the reliability of existing infrastructure” and achieve 99.999% availability/uptime.

Mission Assistant Software (M.A.S)

This system assists the operations team in capturing the acquisition of signal (start) and loss of signal (end) between the antenna and the satellite – that is the time when a satellite passes a specific location at a specific time and the antenna is used to point into that location, ingest data and sends it to systems designed to capture that information.

Initially, acquisition capturing was done manually whereby a user will physically monitor the start and end of the pass as it happens and write the information on paper, which will then have to be retyped in by the reporter. M.A.S improves efficiency by automating acquisition of signal and loss.

Resilience amidst COVID

As an organisation, we are proud that we have not let down any of our clients during the pandemic and we continued to serve them diligently and without compromising on quality. This achievement required collaboration between SANSA's leaders and employees to navigate the risks of COVID-19 effectively.

By the beginning of 2021/22 financial year, it was almost a year since the first COVID-19 case was identified in South Africa which eventually led to regulatory restrictions by government. It was indeed important for the Space Operations team not to fall into the trap of pandemic fatigue by relaxing precautionary measures. SANSA continued to implement and practice COVID-19 protocols by ensuring that personal protective equipment is accessible to all employees.

PROGRAMME 5:

SPACE ENGINEERING

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

PROGRAMME OUTPUTS

The core outputs of the Space Engineering Programme are:

- Creation of direct jobs in the space industry,

- Mission development and support for micro-satellites,
- Mission development and support for nanosatellites, and
- The upgrade and maintenance of key infrastructure.

The outcomes expected from realising these outputs are:

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

PROGRAMME 5: SPACE ENGINEERING

Space Science Programme

Outcome	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O2 Growth of the space sector through SANSa space related industry expenditure	O2.1.1 Expenditure to SME's for core space projects	O2.1.1.1 Percentage contract expenditure to SMEs for core space projects	20%	0%	-20%	1. Pending AIT upgrade negotiations; 2. Supporting SIH financing efforts. 3. Closing out old contracts; and proposals out to DSI for evaluation. 4. Concurrent Design Facility (CDF) procurement is active/in progress
	O2.2.1 SANSa space relate industry expenditure	O2.2.1.1 The total contract expenditure to the broad space related industry for core space projects	R10 million	No progress on expenditure	-R10 million	No expenditure expenditure due to pending AIT upgrade negotiations
O3 Increased human capacity for the implementation of key space initiatives	O3.2.1 Support to students and interns	O3.2.1.1 Number of students and interns supported for formalised training	9	17	+8	A successful recruitment drive resulting in additional students

Outcome	Output	Output Indicator	Annual Target	Actual Achievement	Variance Against Target	Reason for Variance
O4 SANSA repositioned as a key enabler of government's space-related policies	O4.2.1 Significant benefit for the space programme through partnerships	O4.2.1.1 Number of activities initiated through formal International partnerships	1	1	No variance	Annual Target met
		O4.2.1.2 Number of activities initiated through formal African partnerships	1	0	-1	Contracting with the Zimbabwe university and other industry team stakeholders through an MOU is pending
		O4.2.1.3 Number of activities initiated through formal National partnerships	1	0	-1	Concluding industry infrastructure requirements and assisting industry to utilise existing facilities for space development
O5 Appropriate infrastructure developed to support the local space sector	O5.3.1 An upgraded AIT Facility	O5.3.1.1 Progress towards an upgraded AIT Facility	Revised project schedule and implementation plan	Revised project schedule and implementation plan	No variance	Annual target met

Table 10: Space Engineering Performance

PROGRAMME 5: KEY ACTIVITIES / ACHIEVEMENTS FOR THE 2021/2022 FINANCIAL YEAR

Maritime Domain Awareness Satellite (MDAsat)

This programme supported the Cape Peninsula University of Technology (CPUT) effort to design, build and launch three MDAsat satellites through participation in the MDAsat steering committee meetings, managing a formal quotation from SANSA to support MDAsats during commissioning, and is further actively engaging in the data policy and operational phase planning. With three months in orbit the satellites look to be performing as intended, although not fully operationally baselined yet. The operations phase of this small constellation is under heavy debate between CPUT, DSI and SANSA. There is a possibility of mission success if the AIS data captured by the MDAsat constellation can be fused into the OCIMS project database for use by its customers.

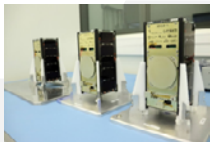
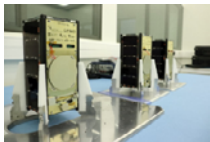


Figure 44: MDAsat images

Concurrent Facility (CD/EF)

This facility development (with assistance from international partnership with ESA) has seen good progress towards implementation during 2022. CDF execution processes and tools training was provided by RHEA (an ESA partner) to a group from SANSA as well as an industry mission specialist. Several operational building blocks are now ready for usage. The CD/EF physical facility located at SANSA head office is currently being installed and it is foreseen that a future extension of the CD/EF facility will be located near the upstream space industry in Western Cape to ensure the efficient participation (logistically and financially) of future industry partners in quick turnaround mission definitions and planning.

Design/Engineering**Space Infrastructure Hub (SIH)**

The SIH business modelling, project management with upstream technical inputs and review of presentations to DSI, EXCO and other stakeholders have been supported by the full Space Engineering team. The SIH implementation is critical to the long-term success of SANSA and specifically the Engineering programme, since it will establish the baseline needs of the projects for the next 5-10 years.

Houwteq AIT Upgrade

The Houwteq AIT Upgrade project has stagnated at ownership of the facility and its assets for a number of years, however, in the recent months some positive movement got underway as to its execution. There were discussions on DG levels between DSI and Department of Public Enterprises (DPE) on Houwteq as an asset and moving it into the care of DSI.

Unfortunately, the Denel facility over the same time has deteriorated such that Denel Properties has made firm decisions that Houwteq and Spaceteq and Space in general is no longer a core focus and will be mothballed to ensure minimal operating cost.

The indications are that the mothballing will initiate as early as April 2022. This carries major risks for DSI, SANSA and the industry in that the facility will become useless until reopened and refurbished. Given the informal settlement encroaching on the Houwteq facility, the risk of facility and equipment damage is high and eminent.

Industry Exposure, Collaboration and Partnerships

The Engineering team remains engaged with the upstream satellite industry to ensure that collaboration opportunities become visible and can be guided/supported to align with SANSA missions. There are a few opportunities that could give rapid positive results should access to Houwteq be secured.

13. LINKING PERFORMANCE WITH PROGRAMME BUDGETS

Programme	2020/21 Financial Year (R'000)			2021/22 Financial Year (R'000)		
	Budget	Actual	(Over) / Under Expenditure	Budget	Actual	(Over) / Under Expenditure
Programme 1: Administration	73,339	60,331	13,009	92,269	68,851	30,418
Programme 2: Earth Observation	95,029	66,139	28,890	93,603	66,699	26,904
Programme 3: Space Science	63,863	50,227	13,636	88,737	91,548	(2 811)
Programme 4: Space Operations	97,275	82,153	15,123	77,187	64,553	12,634
Programme 5: Space Engineering	4,665	4,253	413	12,640	7,042	5,598
Total (R'000)	334,172	263,102	71,070	371,436	298,693	72,743

Table 11: Linking Performance with Budgets

The actual expenditure for the period under review was less than anticipated and this is mainly attributable to the slow spending patterns related to the lockdown restrictions emanating from the Covid-19 pandemic. The Administration programme initiated a number of strategic interventions such as the change management process and new business model implementation, which is envisaged to be concluded in 2022/23 financial period thus also impacting expenditure.

An amount of R16 million in unspent ring-fenced grant funding for the Earth Observation programme is expected to be realised in the 2022/23 financial year. The Space Weather Centre project under the Space Science programme, commenced in October 2019 and

implementation continued in the 2021/22 financial year with the carrying forward of the grant funding for project completion in the 2022/23 financial year.

The Space Operations programme received new contract revenue towards the end of the 2021/22 financial year for continuation in the next financial year. The low spending in the Space Engineering programme is mainly attributable to the AIT project which was yet to be implemented as at the end of the 2021/22 financial year.

14. REVENUE INFORMATION

Revenue Sources	2020/21 Financial Year (R'000)			2021/22 Financial Year (R'000)		
	Estimate	Actual Amount Realised	Variance	Estimate	Actual Amount Realised	Variance
Contract Income: Public	17,041	18,005	964	20,771	16,710	(4,061)
Contract Income: Private	5,375	5,605	230	5,436	6,451	1,015
Contract Income: Foreign	50,391	52,032	1,640	41,852	51,839	9,987
Other Income	2,868	6,123	3,255	3,286	8,019	4,733
Total (R'000)	75,676	81,765	6,089	71,345	83,019	11,674

Table 12: Revenue Information

In the 2021/22 financial year the total revenue budgeted was exceeded by R11.7 million which was mainly attributed to additional foreign income earned through Space Operations from Intelsat and Paneos. The insignificant increase of 1.43% in contract income is indicative of the effect of the Covid-19 pandemic on the local and especially the international economy.

The decline in public contract income of R4 million in comparison to the budgeted 2021/22 amount is due to the budget constraints experienced by public entities during the 2021/22 financial year.

Other income is mostly derived from interest earned on the positive bank balance and ring-fenced grants as well as an insurance pay-out.

2021/22 Key Infrastructure Projects	Pipeline Projects
Space Infrastructure Hub (SIH)	Matjiesfontein Ground Segment
Regional 24-Hour Space Weather Centre with Data Centre	Solar Telescope Installation
Extension of Student Residence (Hermanus site)	

Table 13: Capital Investment

15. CAPITAL INVESTMENT

CAPITAL INVESTMENT, MAINTENANCE AND ASSET MANAGEMENT PLAN

SANSA policies assist in ensuring resources are affectively and efficiently managed. The Asset Management Policy is aligned with proper management of asset infrastructure and reporting thereof. The application of resources are monitored through maintenance plans, risk management processes and business continuity plans to safeguard the optimal utilisation of SANSA's infrastructure for operational and industry applications.

In the financial year under review, SANSA identified several key infrastructure projects with an estimated value of R4.54 billion. The major infrastructure project is the development of the Space Infrastructure Hub for which the feasibility study was concluded in this financial year.

The Agency has undertaken another key project with the establishment of a regional 24-hour Space Weather Operational Centre which was at 70% completion as the end of the financial period under review. The centre includes a high-technology ICT infrastructure to support the space weather data centre and operations. The construction of the centre and installation of the data centre is due for completion in the 2022/23 financial year with the 24-hour operations commencing in the same period.

Funding for the extension of the student residence as well as Guest Accommodation at the Hermanus site, has been secured with construction envisaged to commence at the beginning of the 2022/23 financial year.

Proposals will be submitted for the following large infrastructure projects:

- Space Infrastructure Hub (SIH) – Phase 1
- Solar Telescope Installation
- Matjiesfontein Ground Segment



PART C:

Governance

1. INTRODUCTION

SANSA was established in terms of the SANSA Act (Act 36 of 2008, as amended), and forms part of the portfolio of entities reporting to the Department of Higher Education, Science, and Innovation. In addition, the Agency abides by the legislative mandate as stipulated by the Space Affairs Act (Act No. 84 of 1993) an instrument of the DTI, which provides for the regulatory/policy context for a South African space programme.

The Agency is governed by the PFMA and related National Treasury Regulations and is a Schedule 3A entity. SANSA furthermore strives to abide by the highest standards of governance and best practice and throughout the financial year ended 31 March 2021 adopted principles of the King Report on Governance (King IV Report) where feasible.

2. PORTFOLIO COMMITTEES

Parliament exercises its role through evaluating the performance of public entities by interrogating their annual financial statements and other relevant documentations which are required to be tabled, in addition to any other documentation tabled from time to time.

The Standing Committee on Public Accounts (SCOPA) reviews the annual financial statements and the audit reports issued by the external auditor.

The Portfolio Committee on Higher Education, Science and Technology exercises oversight over the service delivery performance of public entities and, as such, reviews the non-financial information contained in the annual reports of public entities. The Portfolio Committee is concerned with service delivery and enhancing economic growth. SANSA furthermore presents the Agency's strategic plan and annual performance plans to the Portfolio Committee.

3. EXECUTIVE AUTHORITY

SANSA reports to the Minister of Higher Education, Science and Innovation as prescribed by the PFMA and SANSA Act. The Executive Authority has the power to appoint and dismiss the Board of a public entity and must ensure that members of the Board have the necessary skills and experience to guide the public entity.

SANSA presents the annual report, strategic plan and annual performance plans to the Minister of Higher Education, Science and Innovation. During the year under review SANSA submitted all prescribed reports (e.g. quarterly reports) and complied with the provisions of the PFMA.

THE BOARD AS AN ACCOUNTING AUTHORITY

The Board is the Accounting Authority in terms of the PFMA and reports to the Minister of Higher Education, Science, and Innovation (Executive Authority). The Board is responsible for providing SANSA with strategic direction, ethical leadership and ensures that the Agency abides by good corporate governance principles.

THE ROLE OF THE BOARD

The responsibilities of the Board are dictated primarily by the SANSA Act and the PFMA. Section 9 of the SANSA Act stipulates the Board's main function and responsibility, which are to add significant value to SANSA by:

- Performing any function imposed upon it in accordance with the policy issued by the Minister and in terms of the SANSA Act;
- Overseeing the functions of the Agency;
- Monitoring the research priorities and programmes of the Agency;
- Giving effect to the strategy of the Agency in the performance of its functions;
- Notifying the Minister immediately of any matter that may prevent or materially affect the achievement of the objectives of the Agency; and
- Establishing or disbanding the Agency's organisational divisions, as appropriate, after consultation with the Minister.

COMPOSITION OF THE BOARD

As of 31 March 2022, the Board consisted of ten non-executive members and the Acting CEO as an ex officio member of the Board.

In terms of the SANSA Act, Board members are appointed for a term not exceeding four years and are eligible for re-appointment for one further term thereafter. The Minister appointed the current Board members with effect from 1 September 2018. During the current reporting period, two Members, Mr Eugene Jansen, resigned from the SANSA Board effective from 29 November 2021, and Mr Johan Prinsloo resigned from the SANSA Board effective from 14 February 2022.

The Chief Executive Officer (CEO) of SANSA, Dr Val Munsami resigned from the organisation effective from 28 February 2022. Ms Andiswa Mlisa was appointed as the Acting CEO as from 01 March 2022 whilst the Board is undertaking the process of recruiting a new CEO.

Please refer to the tables that follow for further information on the SANSA Board.

Name	Designation	Date appointed	Date resigned	Qualifications	Area of expertise	Active directorships outside SANSA	Other Committees
Ms Xoliswa Kakana	Board Chairperson	01/09/2018	8/7/2022 (post the reporting period)	BSc (Maths and Applied Science); MSc (Electronic Engineering); MBA; MS, Global Leadership, and Innovation Programme; Master's in Public Administration	Innovation and technology service and business development	ICT-Works (Pty) Ltd; University of Johannesburg (Council Member); ZACR - ZA Central Registry (NPC)	Board Chairs Committee
Dr Ashley Naidoo	Board Member	01/09/2014 re-appointed 01/09/2018	-	BSc (Paed), Bsc (Hons); MSc (Marine Zoology) PhD (Ocean Governance)	Environment, Ocean Science and Governance	-	Audit and Risk Committee
Prof Azwinnidini Muronga	Board Member Appointed as Acting Board Chairperson effective 26/7/2022 (post the reporting period)	01/09/2018	-	PhD (Physics); MSc (Physics); BSc (Mathematics and Physics); University Education Diploma	Physics and education	-	Strategy and Investment Committee
Mr Eugene Jansen	Board Member	01/09/2014 re-appointed 01/09/2018	29/11/2021	MSc (Eng), BEng (Electronic Engineering); MBA	Technology and investment	VAV Investment Holdings (Pty) Ltd; Stone Three Communications (Pty) Ltd; Acorn Private Equity (Pty) Ltd; Halotype Investments (Pty) Ltd; PPO Serve (Pty) Ltd	Audit and Risk Committee; Strategy and Investment Committee

Name	Designation	Date appointed	Date resigned	Qualifications	Area of expertise	Active directorships outside SANSA	Other Committees
Adv Ikho Kealotswa-Matlou	Board Member	01/09/2018	-	LLB; LLM	Space law	-	Human Resources, Social & Ethics Committee
Ms Innocentia Pule	Board Member and Audit and Risk Committee Chairperson	08/06/2016 re-appointed 01/09/2018	-	CA (SA); GEDP; TGM	Finance	M-Care Operating Holdings (Pty) Ltd; M-Care Property Holdings (Pty) Ltd; OneLogix Group Ltd; Excellerate Holdings; Mwaloni Holdings	Audit and Risk Committee; Board Chairs Committee
Mr Johan Prinsloo	Board Member and Strategy and Investment Committee Chairperson	01/09/2014 re-appointed 01/09/2018	14/02/2022	BEng (Electronic Engineering)	Satellite and communications technology	-	Strategy and Investment Committee Board Chairs
Ms Lumka Msibi	Board Member	01/09/2018	-	BSc (Aeronautical Engineering)	Aerospace engineering	-	Strategy and Investment Committee; Audit and Risk Committee
Ms Mariam Paul	Board Member	01/09/2018	-	MEng (Electrical and Electronics); B. Tech (Electrical and Electronics) MBA	Telecommunications and technology	-	Human Resources, Social and Ethics Committee; Strategy and Investment Committee

Name	Designation	Date appointed	Date resigned	Qualifications	Area of expertise	Active directorships outside SANSA	Other Committees
Ms Mbali Mfeka	Board Member	01/09/2014 re-appointed 01/09/2018	-	BCom (Hons); MBL; MDP; GEDP	Finance	Gammatec NDT Suppliers SOC Ltd	Audit and Risk Committee
Ms Nomfuneko Majaja	Board Member and HR, Social and Ethics Committee Chairperson	01/09/2018	-	BCom (Hons); MA (Development Econ)	Government, legal and compliance (including space affairs and special economic zones)	Ubuntu's Guest House; Poz Perfect Pampering	Human Resources, Social and Ethics Committee;; Board Chairs Committee
Mr Willie van Biljon	Board Member	01/09/2014 re-appointed 01/09/2018	-	BSc Eng (Mech), M Eng (Mech)	Aerospace engineering and business development	-	Human Resources, Social and Ethics Committee; Strategy and Investment Committee
Dr Val Munsami	Chief Executive Officer and ex officio Board Member	01/01/2017	28/02/2022	PhD (Physics), MBL	Space Strategy, Satellite and Telecommunications, Astronomy	-	Strategy and Investment Committee
Ms Andiswa Mlisa	Acting Chief Executive Officer and ex officio Board Member	01/03/2022	-	MSc: GIS & Remote Sensing, MBA	Space Science, Technology, Earth Observation, Geographic Information System	-	Strategy and Investment Committee

Table 14: Composition of the Board

BOARD MEETINGS AND ATTENDANCE

Meetings held by the Board and attendance by members during the twelve months ended 31 March 2022 are reflected in Table 15 below:

Member	Meeting held 28/05/ 2021	Special Meeting held 23/06/ 2021	Meeting held 28/07/ 2021	Meeting held 29/07/ 2021	Special Meeting held 23/08/ 2021	Meeting held 29/09/ 2021	Meeting held 26/10/ 2021	Meeting held 03/11/ 2021	Meeting held 22/11/ 2021	Meeting held 03/12/ 2021	Meeting held 10/12/ 2021	Meeting held 20/01/ 2022	Meeting held 24/02/ 2022
A Muronga	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
A Naidoo	X	Y	Y	Y	Y	Y	Y	Y	Y	X	X	X	Y
E Jansen	Y	Y	Y	Y	X	Y	X	X	Y	■	■	■	■
I Keatlotwe-Matlou	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y
I Pule	Y	Y	Y	Y	Y	X	Y	Y	Y	X	Y	Y	Y
J Prinsloo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	■
L Msibi	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M Mfeka	X	Y	Y	X	Y	Y	Y	X	Y	Y	X	Y	Y
M Paul	Y	X	Y	Y	Y	X	Y	Y	Y	Y	Y	Y	X
N Majaja	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y
W van Biljon	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
X Kakana	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X
V Munsami	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 15: Board Meetings and Attendance

Y – present X – apology ■ – Not a Member

SANSA BOARD MEMBERS



Ms Xoliswa Kakana
Board Chairperson



Ms Innocentia Pule
Board Member



Ms Lumka Msibi
Board Member



Dr Ashley Naidoo
Board Member



Prof Azwinnadini Muronga
Board Member



Ms Mbali Mfeka
Board Member



Mr Eugene Jansen
Board Member



Mr Johan Prinsloo
Board Member



Ms Nomfuneko Majaja
Board Member



Mr Willie van Biljon
Board Member



Adv Ikho Kealotswe-Matlou
Board Member



Ms Mariam Paul
Board Member

BOARD CHARTER

The Charter sets out the role and functions of the Board, highlights the fiduciary responsibility and accountability, as well as the internal structures and operations of the Board. The Charter is informed by a number of legislative prescripts and governance guidelines. These include the provisions of the South African National Space Act 36 of 2008 (the Act) as amended, the Public Finance Management Act 1 of 1999 (the "PFMA") and the King IV report on Corporate Governance. In accordance with the provisions of section 6(1) of the Act, the Board governs the Agency.

Board Committees

Four (4) standing Board Committees support the Board in discharging its functions. The responsibilities and functions of Board Committees are set out in respective Board-approved Board Committee(s) charters which are reviewed annually.



Figure 45: Board and standing committees' structure

BOARD CHAIRS' COMMITTEE

The Board Chairs' Committee is responsible for assisting the Board in fulfilling its oversight responsibilities in respect of all matters, and in particular to resolve issues that require urgent attention or any matter that may be referred to the BCC by the Board, the Board Chairperson, or any Board Committee Chairperson through the Board Chairperson. The BCC has approval authority as delegated by the Board through the SANSA Delegation of Authority Policy or otherwise as the Board may determine from time to time.

The recent resignations of Mr Eugene Jansen and Mr Johan Prinsloo which left the Board with 4 (four) vacancies, were discussed at the BCC meeting held on 16 February 2022. It was noted that, subsequent to the resignation of the first two board members during FY2020/21, the Chairperson formally notified the Minister

and with the recent resignation of Mr Jansen and Mr Prinsloo. The matter has since been taken into consideration by the DSI, and the advert for the SANSA Board has been issued.

Having noted that the term of the Board will expire in August 2022, the BCC agreed to recommend members for allocation on the committees in the intervening process in order to manage the quorum and skills challenges within the subcommittees of the Board until the appointment process.

The BCC recommended that:

- Advocate Icho Kealotswe-Matlou and Ms Lumka Msibi be allocated to serve on the Audit and Risk Committee.
- Mr Willie van Biljon be allocated to serve on the Strategic Investment Committee.
- Prof Azwinndini Muronga as the Chairperson of the Strategic Investment Committee.

BOARD CHAIRS' COMMITTEE MEETINGS AND ATTENDANCE

Meetings held by the Board Chairs' Committee and attendance by members during the twelve months ended 31 March 2022 are reflected in Table 16 below:

Member	Meeting held 15/04/21	Meeting held 29/04/21	Meeting held 20/05/21	Special Meeting held 23/06/21	Special Meeting held 17/08/21	Special Meeting held 23/08/21	Special Meeting held 01/09/21	Special Meeting held 13/09/21	Special Meeting held 17/09/21	Special Meeting held 23/09/21	Meeting held 09/10/21	Meeting held 09/10/21	Special Meeting held 24/11/21	Meeting held 16/02/22	Meeting held 16/03/22	Meeting held 17/03/22
X Kakana	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
I Pule	Y	Y	Y	Y	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
J Prinsloo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	■	■	■
N Majaja	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
A Muronga	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Y	Y

TABLE 16: Board Chairs Committee Attendance Y – present X – apology ■ - Not a Member

AUDIT AND RISK COMMITTEE

The establishment of the Audit and Risk Committee complies with Sections 76(4)(d) and 77 of the PFMA and Section 3 of the National Treasury Regulations. As at 31 March 2022, the Committee consisted of four non-executive members and the Committee Chairperson was Ms Innocentia Pule, as indicated in Table 17 below. During the period under review Mr Eugene Jansen resigned as a Board Member with effect from 29 November 2021 and ceased to be a member of the Committee.

The Audit and Risk Committee provides independent oversight over:

- The effectiveness of SANSA's internal control systems and functions, including the audit function;
- The management of SANSA's risks; and
- The adequacy, reliability, and accuracy of the financial information.

AUDIT AND RISK COMMITTEE MEMBERS AND MEETING ATTENDANCE

Member	Meeting held 16/04/ 2021	Meeting held 18/05/ 2021	Special Meeting held 26/05 2021 128/05/2021	Special Meeting held 31/05/ 2021 28/05/2021	Special Meeting held 15/06/ 2021 28/05/2021	Meeting held 15/07/ 2021 202128/05/2021	Meeting held 26/07/ 2021	Special Meeting held 19/08/ 2021	Meeting held 15/10/ 2021	Meeting held 10/01/ 2022	Meeting held 10/02/ 2022
A Naidoo	Y	X	Y	X	X	X	Y	Y	X	X	X
E Jansen	Y	Y	Y	Y	Y	Y	X	Y	Y	■	■
I Pule	Y	Y	X	Y	Y	Y	Y	Y	Y	Y	Y
M Mfeka	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 17: Audit and Risk Committee Meeting Attendance

Y – present X – apology ■ – Not a Member

HUMAN RESOURCES, SOCIAL AND ETHICS COMMITTEE

The Human Resources, Social and Ethics Committee consisted of four non-executive Members and the Executive Director: Enterprise Services as an ex-officio member as at 31 March 2022. Ms Nomfuneko Majaja served as Chairperson of the Committee during the period under review.

The Committee assists the Board with oversight of matters relating to human resources, remuneration, code of conduct and social and ethics. The Committee is responsible to, among others:

- Ensure that the Human Resources strategy supports the Agency's vision, mission, and associated activities; and
- Oversee human resource-related issues, including employee benefits, succession planning, organisational design, and talent management.

HUMAN RESOURCES, SOCIAL AND ETHICS COMMITTEE MEMBERS AND MEETING ATTENDANCE

Member	Meeting held 11/05/2021	Meeting held 22/07/2021	Meeting held 20/10/2021	Meeting held 12/01/2022	Meeting held 08/02/2022
I Kealotswe-Matlou	Y	Y	Y	Y	Y
N Majaja	Y	Y	Y	Y	Y
M Paul	Y	Y	Y	Y	Y
W van Biljon	Y	Y	Y	Y	Y
A Slavin	Y	■	■	■	■
V Munsami	■	Y	Y	■	■
V Ntshoko	■	■	■	Y	Y

Table 18: Committee Membership and Meeting Attendance

Y – present X – apology ■ – Not a Member

STRATEGY AND INVESTMENT COMMITTEE MEMBERS AND MEETING ATTENDANCE

As at 31 March 2022, the Strategy and Investment Committee consisted of five non-executive Members, the Chief Executive Officer (CEO) and Chief Financial Officer (CFO) as executive Members. As ex-officio Board Member, the CEO did not have voting rights and the same applied to the CFO. Mr Johan Prinsloo served as the Committee Chairperson during the period under review. He tendered his resignation from the SANSA Board on 14 February 2022 and Professor Azwinndini Muronga was nominated as Committee Chairperson.

The Committee assists the Board in discharging its responsibilities to, among others:

- Facilitate and oversee the strategic planning process;
- Ensure that the Strategic Plan sets out performance priorities; and
- Ensure relevant resourcing of SANSA's strategic initiatives.

During the 12-month period ended 31 March 2022, the Committee convened seven meetings. The Committee members and attendance are as shown in the table below.

Member	Meeting held 16/04/2021	Meeting held 13/05/2021	Meeting held 15/07/2021	Meeting held 15/07/2021	Meeting held 14/10/2021	Meeting held 14/01/2022	Meeting held 09/02/22
A Muronga	Y	Y	Y	Y	Y	Y	Y
E Jansen	Y	Y	Y	Y	Y	■	■
J Prinsloo	Y	Y	Y	Y	Y	Y	Y
L Msibi	Y	Y	Y	Y	Y	Y	Y
M Paul	Y	Y	Y	Y	Y	Y	Y
V Munsami	Y	Y	Y	Y	Y	X	Y
D Bongoza	Y	Y	X	X	X	■	■
L Engelbrecht	■	■	Y	Y	Y	Y	Y

Table 19: Committee Membership and Meeting Attendance

Y – present X – apology ■ – Not a Member

REMUNERATION OF BOARD MEMBERS

Board Member remuneration is aligned with National Treasury guidelines on Remuneration of Board Members, as set out in the Annual Financial Statements. The Board is categorised at level A2 and Board members are paid to prepare for and attend meetings. Board members are furthermore reimbursed for travel costs (airfares, car hire and accommodation) and incidental expenses such as parking, train fares and the use of personal vehicles (reimbursed per kilometre as per the SANSA travel policy). Board members who represent other government departments or institutions (or who are in the employ of government) are not remunerated unless proof of permission to do remunerative work outside their normal official duties is submitted.

THE EXECUTIVE COMMITTEE

THE ROLE OF THE EXECUTIVE COMMITTEE

The CEO and the executive management are responsible for ensuring effective and efficient management of SANSA's operations and driving the achievement of SANSA's mandate. The management structure was designed to meet SANSA's needs towards attaining its goals.

The Executive Committee includes the CEO, CFO, Executive Directors: Enterprise Services and Space Engineering, the Managing Directors: Earth Observation, Space Science and Space Operations and the Board Secretary.

EXECUTIVE MANAGEMENT



Dr Val Munsami
CEO (Until 28.02.2022)



Ms Andiswa Mlisa
**MD: Earth Observation/
Acting CEO** (Effective 01.03.2022)



Mr Amal Khatri
ED: Space Engineering
(Until 28.02.2022)



Dr Lee-Anne McKinnell
MD: Space Science



Ms Leonie Engelbrecht
Acting CFO
(Effective 28.06.2021)



Mr Raoul Hodges
MD: Space Operations



Mr Michael Kabai
Acting Board Secretary
(Effective 01.03.2022)

RISK MANAGEMENT STRATEGY

Enterprise Risk Management (ERM) within SANSA concerns the means by which SANSA applies risk and opportunity considerations in developing strategic outcomes, in implementing them over all programmes, projects, initiatives and activities, and managing them through controls. The SANSA ERM process is aligned to the Public Sector Risk Management Framework. Further alignment include the ISO 31000 and the King IV Report on Corporate Governance for South Africa: 2016. Effective ERM within SANSA is supported by effective governance structures, robust ERM policy and a risk-focused culture.

In identifying strategic risks and opportunities, SANSA considers both internal and external sources of risks. Internal sources include both Bottom-Up which are either risks that are identified at every level of SANSA and those operational risks which may have a SANSA-wide impact, and Top-Down which are risks that are high level, long term risks which may not necessarily belong to a single programme/functional area.

External sources of risks may involve government-wide risks which may have an impact on SANSA, industry risks, etc.

The focus of ERM in SANSA is on identifying, assessing, managing and monitoring all known forms of risks and opportunities across SANSA. To this end, SANSA conducted strategic, operational and fraud risk assessments during the year under review. Quarterly reviews of risks and opportunities, emerging risks as well as risk treatment plans are conducted to ensure that the ERM Policy and processes are implemented and embedded across SANSA. Quarterly risk reports are compiled for consideration by the ARC and the Board. Quarterly performance reporting to the ARC, Board and the Shareholder encompasses reporting on strategic risks and progress in relation to the implementation of the risk treatment plans.

#	Indicator symbol	Description
1 Naidoo	▶	No change in the residual risk exposure, since the last quarter.
2	▲	The residual risk exposure has increased, since the last quarter.
3	▼	The residual risk exposure has decreased, since the last quarter.

Table 20: Movement in Residual Risk Exposure

The table below highlights the residual risk exposures for strategic risks identified:

Outcome #	Risk #	Risk description	Overall Control Adequacy	Q1	Q2	Q3	Q4
3	SR7	Inability to absorb new and innovative skills generated through a "pipeline".	Inadequate	▶	▶	▶	▶
4	SR8	Inability to initiate the development of the satellites as part of the SIH Programme.	Inadequate	▶	▼	▼	▶
3	SR9	Inability to deliver on all components of the space infrastructure Hub (SIH).	Partially adequate	▶	▼	▼	▶
2	SR3	Drastic reduction in requirements for space-based products and services	Partially adequate	▶	▼	▶	▶
2	SR4	Significant decline in the generation and dissemination of new knowledge.	Partially adequate	▶	▶	▼	▶
5	SR11	Sub-optimal relationships with industry & national stakeholders, disadvantaging SANSA.	Inadequate	▶	▼	▼	▶
5	SR10	Fractured incoherent development (reactive responses on opportunistic basis as opposed to targeted pro-active development).	Inadequate	▶	▼	▶	▶
3	SR6	Failure to meet contractual obligations for international and local Stakeholders.	Adequate	▶	▶	▶	▼
3	SR5	No availability or erratic data delivery to EO and poor TT&C (Telemetry and tracking & Command) services locally and globally.	Partially adequate	▶	▼	▶	▶
1	SR2	Significant reduction in the number of postgraduate students and interns that can be supported with effect from the 2021 and outer academic years.	Partially adequate	▶	▶	▼	▶
1	SR1	Reduced ability to create awareness amongst the youth to maintain and/or grow the pipeline.	Partially adequate	▶	▶	▶	▼

Table 21: Residual risk exposures for strategic risks

Below is a summary of high risk areas underlying the movements in residual risks for the year under review:

Completion of the EO-Sat1 satellite build programme:

A proposal describing the EO-Sat1 contracting history, current stakeholder environment and two options on how to proceed were submitted and accepted by the SANSA Board for submission to the DSI Director General (DG). DSI as the sponsor of the EO-Sat1 project indicated a clear understanding of the options and the next step responsibility to decide and contract SANSA accordingly.

In parallel to the proposal option considerations, the SANSA Board has supported consolidation and close-out of all lapsed existing related contracts with Denel Spaceteq to establish a clean contractual baseline for the future.

Transfer of the Houwteq facility ownership from Denel to SANSA:

The prolonged delay relating to transfer of the Houwteq facility from Denel to SANSA has negatively impacted establishment of an Assembly, Integration, and Testing (AIT) facility by the entity to ensure the provision of

relevant support to industry. Tireless efforts by Management, however, to engage Denel and the DSI amongst other key stakeholders led to the exploration of alternatives and subsequent development of a revised implementation plan for this project. There are still risks associated with shifts in the industry's current usage of Houwteq and industry requirements that will need to be closely monitored more so in the context of the Denel call to mothball the facility.

Suboptimal funding levels:

The allocated budget for SANSA remains at a suboptimal level and has prompted the entity to actively seek additional funding to be able to fulfil its mandate. Some of these funding commitments include investor funding, which require SANSA to be able to borrow. This has implications for SANSA's future operating model and its functioning as a Schedule 3A entity.

Protection of SANSA sites:

SANSA is experiencing interference relating to its operational activities, both from radio frequency interference (RFI) and magnetic interference.

Interventions in this regard include declaring some of the sites as National Key Points (NKP)s and instituting regulatory reforms to protect these sites.

New SANSA Business Model:

The unveiling of the new business model in the quarter under review marked a significant milestone in SANSA's strategic trajectory and focus remains on the phased-out transitioning of the organisation in alignment with this model. This will not be achieved without a certain degree of complexity given the envisaged dual focus on continued implementation of the revised 2020/25 strategy and 2022/23 Annual Performance and Operational Plans whilst at the same time pursuing a staggered approach in terms of migrating to the new organisational business model. Key strategic risks that will continue to be monitored and mitigated by the entity thus include averting possible disruptions to core business operations through parallel change management and organisational culture initiatives to keep employees focused on the delivery of SANSA's mandate.

RISK ASSESSMENTS

The Audit and Risk Committee (ARC) which is the sub-committee of the Board of Directors, assesses and reviews the adequacy and effectiveness of the ERM processes across SANSA. Further, the ARC oversees ERM on an ongoing basis to ensure it supports the organisation in setting and achieving its strategic and operational outcomes. The ARC sets the direction for how SANSA should approach and address risks and opportunities and provides advice to management to ensure effective and efficient risk management.

The ARC has delegated the responsibility for a number of specialist topics in relation to ERM such as strategic risk, operational risk, business continuity, fraud risk/ Whistle blowing, combined assurance, irregular, and fruitless and wasteful expenditure, etc. The ARC further provided oversight on the impact of Covid-19 to ensure continuity of operations across SANSA. The EXCO was delegated the responsibility for reviewing the reports from the Covid-19 Joint Operations Committee on the risk mitigation activities necessary for managing the pandemic.

INTERNAL CONTROLS

INTERNAL AUDIT

The Internal Audit department reports functionally to the ARC. The committee was established in terms of section 51(1)(a)(ii) of the PFMA and section 27.1.1 of the Treasury Regulations (PFMA 76(4) (d)), whereby the Board must establish an audit committee as a subcommittee of the Board.

The committee monitors, inter alia, compliance with legislation and ensures that appropriate systems of internal control are implemented and maintained to protect SANSA interests. The committee further reviews the activities and effectiveness of the Internal Audit function.

Internal Audit focuses on the risk, governance, compliance and control processes of the organisation and is responsible for expressing an opinion on the adequacy and effectiveness of the internal controls within those processes. Internal Audit is not responsible for the implementation and related controls

of any business processes. However, SANSA management is responsible for the achievement of the business objectives, which includes the design, implementation and monitoring of adequate and effective internal controls.

Internal Audit evaluates processes with the view of providing assurance that the internal controls with the entity are operating as intended and in so doing, assist in the achievement of the strategic objectives of the organisation. Internal Audit further ensures that any identified weaknesses in controls, governance and risk are adequately and timeously resolved. The work of internal audit is monitored by the ARC.

The committee reviewed the Internal Audit findings and related remedial action plans regularly, to understand the impact on the financial reporting process, the recommended and planned remedial actions, considered their appropriateness and advised accordingly.

COMPLIANCE

Governance priorities for SANSA are centred on promoting a culture of sound internal controls, policies, and procedures that reach far beyond mere legal compliance. The development and implementation of effective risk management and compliance systems to drive the achievement of the entity's strategic outcomes and a continued focus on compliance with all applicable laws remained key during the financial year.

The review and development of SANSA's Compliances Frameworks, Policies and Structure in alignment with the new business model was another key area of focus and significant progress was realised with GTAC support.

SANSA also continued to implement planned SHEQ management activities. These activities entailed the effective identification and mitigation of SHEQ risks through ensuring

ongoing SHEQ compliance, training, and certification.

The Agency's Hermanus facility also secured ISO 9001:2015 certification for its products and services during the final quarter of 2021/22 due to unceasing preparations in setting up systems to ensure certification.

FRAUD AND CORRUPTION

There were no reported cases on the National Anti-Corruption Hotline (NACH) for the period under review. Priorities for the 2022/23 financial year include continuation of training to enhance employee awareness on the NACH processes relating to instances where fraud cases have been reported, escalated to SANSA, investigations, and final outcomes.

MINIMISING CONFLICT OF INTEREST

Supply Chain Management (SCM) Processes to minimise conflict of interest:

There are three SCM Committees which SANSA employees serve on: Bid Specification Committee, Bid Evaluation Committee and standing Bid Adjudication Committee. Staff members serving on these committees are required to declare the extent of their conflict of interest in writing, prior to the commencement of the committee meeting. Depending on the nature of the conflict of interest, members can either continue with participation in the discussion or recuse themselves from participating in the discussion and activities of the committee.

Furthermore, all bid committees and SCM officials are required to complete and commit to the Code of Conduct. All employees also declare their interest on an annual basis.

BROAD-BASED BLACK ECONOMIC EMPOWERMENT (B-BBEE) COMPLIANCE PERFORMANCE INFORMATION

The table below has been completed in accordance with the compliance requirements as required by the B-BBEE Act and as determined by the dtic. SANSA is currently focused on improving its levels of compliance with the set criteria and the implementation of all relevant measures to comply remains a priority.

Has the Public Entity applied any relevant Code of Good Practice (B-BBEE Certificate Levels 1 – 8) with regards to the following:

Criteria	Response Yes / No	Discussion (SANSA responses / measures taken to comply)
Determining qualification criteria for the issuing of licences, concessions or other authorisations in respect of economic activity in terms of any law?	No	This requirement is not aligned to the SANSA legislative mandate.
Developing and implementing a preferential procurement policy?	Yes	The entity's SCM Policy has been aligned to requirements of the Preferential Procurement Policy Framework Act (PPPFA)
Determining qualification criteria for the sale of state-owned enterprises?	No	This requirement is not aligned to the SANSA legislative mandate.
Developing criteria for entering into partnerships with the private sector?	No	SANSA utilises the criteria provided in Treasury Regulation 16 which has been aligned to the SCM Policy.
Determining criteria for the awarding of incentives, grants and investment schemes in support of Broad Based Black Economic Empowerment?	No	Entity has developed a 5-year B-BEE strategy in 2021/22. One of the activities within the strategy is the development of a policy that will contain criteria for the awarding of incentives, grants, and investment schemes in support of Broad Based Black Economic Empowerment.

Table 22: SANSA B-BBEE Compliance

Stringent health and safety measures are being closely monitored to minimise occurrences throughout the organisation. During this reporting period, SANSA continued to implement planned SHEQ management activities. These activities entailed the effective identification and mitigation of SHEQ risks through ensuring ongoing SHEQ compliance, training, and certification.

As ongoing SHEQ awareness plays a role in embedding a safety culture in an organisation, weekly SHEQ talks are being developed and communicated. Information Management System awareness sessions targeting the leadership team were also conducted.

Occupational Health and Safety Act 85 of 1993 (Section 14), encourages employees to report and investigate any occurrences, sub-standard conditions and/or hazards that emanate from the business processes. Root cause analysis as well as assessments of the contributing factors

are essential tools in risk mitigation which seeks to improve the entity's SHEQ performance. Through occurrence recalls that are distributed to employees, lessons learnt are identified to minimise the probability of reoccurrences of a similar nature thus fulfilling compliance obligations of the organisation.

To intensify compliance levels, an initiative was undertaken by the SHEQ team to conduct site inspections quarterly to afford leadership an opportunity to assess competency levels of the SHEQ Reps, increase their responsibilities as well as evaluate their impact. SHEQ inspections have an impact on the overall safety implementation in the organisation. Below is the summary of SHE statistics for 2021/22 financial year.

NCRs/SHE Compliant/SHEQ STOP/Occurrences

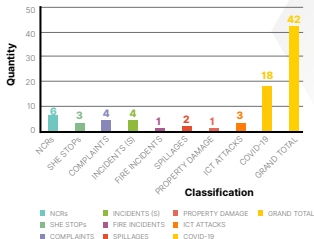


Figure 46: NCRs/SHEQ Compliant/SHE STOP/Occurrences

COMPANY / BOARD SECRETARY

Role / Responsibilities

The responsibilities of a company secretary arise from section 88 of the Companies Act 71 of 2008. A company's secretary is accountable to the company's board. A company secretary's duties include, but are not restricted to:

- Providing the directors of the company collectively and individually with guidance as to their duties, responsibilities and powers;
- Making the directors aware of any law relevant to or affecting the company;
- Reporting to the company's board any failure on the part of the company or a director to comply with the Memorandum of Incorporation or rules of the company or this Act;

- Ensuring that minutes of all shareholders meetings, board meetings and the meetings of any committees of the directors, or of the company's audit committee, are properly recorded in accordance with this Act;
- Certifying in the company's annual financial statements whether the company has filed required returns and notices in terms of this Act, and whether all such returns and notices appear to be true, correct and up to date;
- Ensuring that a copy of the company's annual financial statements is sent, in accordance with this Act, to every person who is entitled to it; and
- Carrying out the functions of a person designated in terms of section 33(3).

SOCIAL RESPONSIBILITY

Broad-Based Black Economic Empowerment

SANSA is committed to economic transformation that brings about meaningful Broad-Based Black Economic Empowerment (B-BBEE). The SANSA Senior Management together with SCM function have developed a set of proposed targets in line with the revised Codes of Good Practice to improve SANSA's performance against the B-BBEE codes.

AUDIT AND RISK COMMITTEE REPORT



“ *It is our view that SANSA has an effective, efficient and transparent system of risk management* **”**

We are pleased to present our report for the financial year ended 31 March 2022.

The Audit and Risk Committee hereby reports that as an independent statutory committee of the SANSA Board, it has complied with its responsibilities arising from Section 51 (1)(a) (ii) of the Public Finance Management Act and Treasury Regulation 27.1. The Committee further reports that it has adopted appropriate

formal Terms of Reference in its Audit and Risk Committee Charter; has regulated its affairs in compliance with this Charter; and has discharged all its responsibilities as contained therein during the period under review.

The Committee has performed the following duties inter alia over the reporting period as guided by its Charter:

- Conducting a review of the effectiveness of SANSA's internal control systems;
- Ensuring that key financial and risk matters in relation to execution of SANSA's mandate were adequately covered as part of the scope for internal and external audits;
- Exercising adequate oversight over the entity's compliance with applicable legal and regulatory transcripts; including but not limited to provisions of the SANSA Act, National Treasury Regulations as well as the PFMA; and
- Overseeing activities of the Internal Audit, Finance and Enterprise Risk Management Units including development and/or review of requisite key strategies, annual work

plans, governance reports and effective monitoring and coordination of management responses and implementation of action plans to address audit recommendations.

Audit and Risk Responsibility

The purpose of the SANSA Audit and Risk Committee is to assist the Board in fulfilling its oversight responsibility on the system of internal financial control, the governance of risk, internal and external audit functions and SANSA's processes for monitoring statutory and regulatory compliance.

Committee Members and Attendance

The Audit and Risk Committee consists of the members as stated on page 149 of this report. In accordance with its approved Terms of Reference, the Committee convened at least four meetings during the year under review. The meetings and schedule of attendance is shown on page 149 of this report. The Chief

Executive Officer, Chief Financial Officer, senior executives and management of SANSA, and representatives of the external and internal auditors attend the Committee meetings by invitation. The Committee also periodically meets separately with external auditors and internal auditors. The internal and external auditors have unrestricted access to the Committee.

The Chairperson of the Committee reports to the Board, after each Committee meeting, on key issues which have been raised and discussed by the Committee.

External Auditors

In execution of its statutory duties during the past financial year, the audit committee:

- Supported the reappointment of Nexia SAB&T in terms of section 4(3) of the Public Audit Act, to conduct the 2021/22 external audit; which was duly approved by the Board and authorised by the AGSA;

- Determined the fees to be paid to external auditors as disclosed in note 25; and
- Determined the terms of engagement with external auditors.

Based on processes followed and assurances received by this Committee, no adverse information has come to our attention regarding the external auditors' objectivity and independence. It has been encouraging to note cordial relations and transparency in relation to the exchange of information and communication between the Audit and Risk Committee, SANSA Board, EXCO and the External Auditors in the execution of the 2021/22 audit processes.

We further note that Nexia SAB&T has been the external auditors for the organisation for 5 years. The procurement of a new audit firm has been initiated to ensure timeous appointment and consultation with the AGSA for the 2022/23 audit.

Risk Management

Oversight over risk management across the entity is the responsibility of the Audit and Risk Committee. The SANSA system of risk management entails the following areas amongst others: (i) Strategic risk management; (ii) Operational risk management; (iii) Business Continuity Management; (iv) Measures for the prevention, investigation and reporting of irregular expenditure, fruitless and wasteful expenditure; and (iv) Fraud Management and Whistle Blowing investigations. A register of reported cases and status updates was kept by management and disclosed through quarterly reporting to the Audit and Risk Committee and the Board.

The Committee has received assurances that SANSA has risk management processes focused on identifying, assessing, managing, and monitoring significant risks across all operations. This has been in place for the year under review and up to the date of approval

of the 2021/22 Annual Financial Statements.

It is our view that SANSA has an effective, efficient, and transparent system of risk management.

Finance Function

The entity appointed Ms Leonie Engelbrecht as an Acting Chief Financial Officer at the end of the first quarter of the 2021/22 financial year as a means of addressing prevailing capacity challenges within finance function. The Committee is satisfied with the expertise and adequacy of resources within the finance function. In making these assessments, the Committee obtained feedback from management as well as external and internal auditors in relation to notable improvements in the quality of Annual Financial Statements and generally sound systems of internal control within the finance and supply chain management functions.

Internal Audit

The Audit and Risk Committee is satisfied with the effectiveness of the internal audit function during the year and that the internal audit activity has addressed the risks pertinent to SANSA. The Committee approved the Internal Audit Charter and the three-year rolling strategic plan inclusive of a one-year operational audit plan. The Internal Audit function completed all audits in its Annual Internal Audit Plan mainly in the areas of Performance Information, Finance, Supply Chain Management, Human Resource Management and Governance.

Internal Audit provided assurance that SANSA operates in a responsibly governed manner by performing the following functions:

- Objectively assuring effectiveness of risk management and the internal control framework; and

- Analysing and assessing business processes and associated controls; and reporting audit findings and recommendations to management and the Audit and Risk Committee.

In addition, the Committee has:

- Evaluated the independence, effectiveness, and performance of the internal audit function and compliance with its mandate;
- Satisfied itself that the internal audit function has the necessary resources, budget, standing and authority within SANSA to enable it to discharge its functions;
- Oversaw that the internal audit annual planned audits are timeously completed; and
- Encouraged co-operation between external and internal audit.

The internal audit manager reported functionally to the Audit and Risk Committee and had unrestricted access to the Audit and Risk Committee Chairperson. The Internal Audit function underwent an external quality assurance review in the prior year, as required by the International Standards.

The Committee is satisfied with the quality of the reports tabled by internal auditors on a quarterly basis during the period under review.

The Effectiveness of Internal Control

The Audit and Risk Committee has reviewed:

- The effectiveness of the entity's internal financial control systems, including receiving assurance from management, internal audit and external audit;
- Significant issues raised by the internal and external audit process, including the manner in which they were/are being resolved.

Overall SANSA's system of internal control and risk management is considered to be effective and transparent as there were no material deficiencies brought to the Committee's attention.

Going Concern

The Committee concurs with the Executive Management that the adoption of the going concern premise in the preparation of the 2021/22 Annual Financial Statements is appropriate.

Annual Financial Statements

In terms of SANSA's Annual Financial Statements, the Committee has:

- Reviewed and discussed the Audited Annual Financial Statements, to be included in the Annual Report, with the external auditors.
- Reviewed the Agency's management letter and management's response to it.
- Reviewed information on predetermined objectives to be included in the Annual Report.
- Considered the applicability of the going concern assumption (as noted above).
- Reviewed the Agency's compliance with legal and regulatory provisions.
- Reviewed significant adjustments resulting from the audit.

The Committee has reviewed the audited SANSA Annual Financial Statements for the year ended 31 March 2022 and is satisfied that these are in compliance with various Acts and Accounting Standards governing disclosure and reporting on the Annual Financial Statements.

Auditor's Report

The Audit and Risk Committee concurs with the Report of the External Auditors and further supports that the 2021/22 Annual Financial Statements should be considered as a fair presentation of SANSAs financial status as of 31 March 2022.

The Committee notes with delight that compliance findings that plagued the organisation for the last two financial years have been resolved and commends Management in achieving this improved audit opinion.

Annual Report

Based on processes and assurances obtained, we recommend the Annual Report to the Board for approval.

Yours faithfully



Ms Innocentia Pule
Chairperson of the Audit and Risk Committee

PART D:

HUMAN RESOURCE MANAGEMENT

OVERVIEW OF SANSA HUMAN RESOURCE MATTERS

HUMAN RESOURCE PRIORITIES FOR THE 2021/22 FINANCIAL YEAR

The approval of the new business model brought many changes to the organisation. Organisational development initiatives aimed at transforming SANSA into a high-performing Agency were the main focus for the year under review. The organisation is going through a transition phase, and like any other change process, it does come with uncertainties and anxieties; SANSA is no different. A few interventions and processes are in place to support these changes, including emotional well-being support for all employees through the Employee Wellness Programme. Change Management Consultants were appointed to assist the organisation in facilitating the Change Management process. The Awareness, Desire, Knowledge, Ability and Reinforcement (ADKAR) change management approach was identified as the suitable approach to be utilised throughout the change journey. This approach focuses on the 'people side' of change, whereas project management focuses on delivering the 'product side' of things.

CHANGE MANAGEMENT PROCESS

The project kick-started with a change readiness survey as a base to find out how ready for change the organisation was. Also, to gauge where SANSA individual employees were positioned on the ADKAR (Awareness, Desire, Knowledge, Ability and Reinforcement) spectrum, intending to identify barriers to change to develop appropriate change management interventions to close identified gaps.

Change management activities differ slightly amongst Programmes due to the varying Programme change characteristics. Survey results were incorporated in developing relevant interventions per Programme. A total of 31 SANSA-wide Change Champions were identified and equipped with skills and competencies for operationalising the ADKAR framework and dealing with employee change management issues at their respective sites. As part of the enterprise change management strategy, six change management plans



were developed, these are, Communication Plan, Sponsor Roadmap, Coaching Plan, Resistance Management Plan, Training Plan, and the Reinforcement Plan.

Leadership Adaptability training, Neuro-leadership training and Sponsor Coalition Workshops were conducted during the period under review. These interventions aim to equip managers with skills to deal with the new way of working and prepare them for the unforeseen as challenges emerge and employees navigate their way through the changes.

Intense Culture and Employee Value Proposition (EVP) Workshops were facilitated towards the end of Quarter 4 and will continue in the first quarter of the new financial year. These workshops gather employees' input to identify the desired culture for SANSA in alignment with the new business model and create an EVP Statement that talks about the way forward. The Change Management project is currently in its ninth month and remains on track. Phases 1 - 6 were concluded during the year under review.



Figure 47
: Overview of the change management project progress as at 31 March 2022

NEW BUSINESS MODEL IMPLEMENTATION

The new business model resulted in the development of a new SANSA Macrostructure with re-structured executive roles. The Executive team is to lead and drive the implementation of the new business model and the associated changes including functional alignment. In addressing the recent vacancies, whilst the organisation prepares for recruitment of these vacancies, and considering the critical role of Executives in the implementation of the new business model, SANSA has continued to look into its existing talent pool to consolidate the leadership team with acting appointments having been made where appropriate to ensure continued stability at this level.

A phased approach of the business model implementation started in February 2022, with several employee consultation sessions across the three SANSA sites which were led by the interim CEO, supported by Chrom Consulting

(consultants leading Change Management initiatives), to ensure a common understanding of this critical project.

All SANSA employees were provided an opportunity to contribute to an organisational Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis in the context of the new business model and put forward their thoughts, fears and ideas relating to the new business model as a mechanism for ensuring open engagement, building a positive mind-set, establishing a commonly-supported new way of doing things and building a common understanding of the realignment of functions. Functional alignment was scheduled as a critical step to commence during the month of March 2022 and into first quarter of 2022/23.

SALARY PARITY EXERCISE

The organisation embarked on a job grading and salary parity project in June 2020. The project consists of two phases. Phase one reviewed and graded all job descriptions, which concluded in February 2022. EXCO approved all the reviewed grades recommended by the SANSA Job Evaluation, Remuneration and Benefits Committee (JERBC). The second phase of the project, salary parity, commenced in March 2022 with a new service provider - Emergence Human Capital. This part of the project is to analyse whether employees rendering comparable work are compensated equally and if the differentiation between them is based on fair judgement as per the "equal pay for work of equal value principle" and how SANSA salaries compare with the market. Phase two of the project is anticipated to conclude in the 2022/23 financial year through delivery of the final salary parity findings,

a salary notching guide, and a review of various policies and procedures dealing with remuneration within SANSA.

TALENT MANAGEMENT

SANSA launched a Skills Audit project in January 2022, intending to identify the existing set of skills within SANSA and align such with the skills and knowledge the organisation will need in the future. Often, the complete skills of employees may not be known to the organisation, affecting access to or harnessing such skills. All job descriptions, along with the new strategy, business model and other relevant documents, were provided

to the appointed service provider, E-bus Tech Consulting. Based on the information provided, they prepared a survey to compare current skills in SANSA with the required skills to determine skills gaps. These skills gaps will be addressed through various HR interventions to ensure SANSA has the capacity and employees have the capabilities to realise the objectives of the new business model. A SANSA 5-year workforce plan is one of the deliverables for this project.



SKILLS DEVELOPMENT AND TRAINING

Skills development and training is critical for organisational success and growth and SANSA remains committed to the continuous rollout of interventions aimed at equipping its employees with skills and knowledge. Training interventions during 2021/22 included the following:

EMPLOYEES TRAINED PER PROGRAMME, RACE AND GENDER FOR 2021/22													
	African		AFRICAN TOTAL	Coloured		COLOURED TOTAL	Indian		INDIAN TOTAL	White		WHITE TOTAL	GRAND TOTAL
	FEMALE	MALE		FEMALE	MALE		FEMALE	MALE		FEMALE	MALE		
EO	10	14	24					2	2		2	2	28
HO	29	15	44	2	1	3	2	1	3	2	1	3	53
SE		1	1		1	1				1	2	3	5
SO	9	15	24	1	2	3		4	4	1	8	9	40
SS	23	17	40	8	6	14	2	3	5	8	10	18	77
GRAND TOTAL	71	62	133	11	10	21	4	10	14	12	23	35	203

Table 23: Total number of employees trained per programme, race, and gender

Internships and In-service Trainees

SANSA had a total of 21 African (6 males and 15 females) interns and in-service trainees placed across various SANSA business units during 2021/22 and two of the interns have been absorbed into SANSA's employee pool.

PROGRAMME						
QUARTER	EO	HO	SE	SO	SS	GRAND TOTAL
QUARTER 1	15	23		7	392	137
QUARTER 2	70	155	3	38	53	319
QUARTER 3	5	30	7	24	2	68
QUARTER 4	20	45	5	39	41	153
GRAND TOTAL	110	253	15	108	188	674

Table 24: Total number of training intervention by Programme, per Quarter

PERFORMANCE MANAGEMENT

The HR team will be the first team to pilot the automated Performance Management system in the first quarter of 2022/23 to ensure the system is working effectively prior to it being rolled out to the rest of the organisation.

The organisation's Annual Performance Plan (APP) and Annual Operational Plan (AOP) have been pre-populated in the system to ensure alignment between organisational and individual performance measures. The 2021/22 final reviews and 2022/23 performance contracts were initiated for conclusion by 30 April 2022 and 31 May 2022 respectively across the organisation.

EMPLOYEE WELLNESS PROGRAMMES

The focus for the reporting period was on dealing with stress, anxiety, and nutrition. Employees are encouraged to utilise the Employee Wellness Programme services especially now as the organisation is going through these changes. Employee Wellness Programme services utilised for this reporting period included telephonic counselling, face to face counselling sessions and legal advice. BestMed medical aid Tempo Programme is providing Pilates classes to all employees twice a week, and monthly health talks.

HUMAN RESOURCE POLICY DEVELOPMENT

The HR policy review project is underway. Out of 27 HR policies, 13 policies were reviewed and approved by the Board. The outstanding policies will be prioritised in the 2022/23 financial year.

KEY HIGHLIGHTS

ACHIEVEMENTS FOR THE YEAR

The approval of the 5-year SANSA Employment Equity Plan has been aligned with the Broad-based Black Economic Empowerment (B-BBEE) Management Control and skills development elements of the scorecard, ensuring that the achievement of EE targets and skills development initiatives move SANSA from BBBEE non-compliant to B-BBEE compliance by each department contributing meaningfully on the various elements of the scorecard and

ultimately transforming the organisation into the future. The Agency has achieved a level 8 B-BBEE score from a non-compliance.

OVERVIEW OF KEY CHALLENGES

Science, Engineering and Technical skills have been a challenge to source and more so females. Skills the organisation requires is scarce, technical and the pool is limited. There has been some growth as new people join the organisation, from 157 total permanent employees at the beginning of the year to 173 at the end of the financial year. There were also employees exiting the organisation, these movements have an impact on the achievements of the EE targets, hence monitoring of progress is vital. SANSA's 2021/2022 EE Targets were a total of eleven (11) African males and females from the three different occupational levels: Professionally Qualified, Skilled Technical and Semi-Skilled levels. One EE target from skilled technical level was not achieved.

HUMAN RESOURCE GOALS / FUTURE PLANS

Organisational development remains a key focus for SANSA in pursuit of the required organisational alignment and the desired culture. The new business model has provided a framework for the following specific actions that have been identified in the 2022/23 HR plans:

- Skills Audit
- Development of a Workforce Plan
- Change Management Programme process
- A review of the Talent Management Framework
- A review of HR policies, processes, and procedures
- Continuous Employee Learning and development

HUMAN RESOURCE OVERSIGHT STATISTICS

PERSONNEL COST BY PROGRAMME FOR THE 2021/2022 FINANCIAL YEAR

Programme	Total Expenditure for the Entity (R'000)	Personnel Expenditure (R'000)	Personnel Expenditure as a % of Total Expenditure (R'000)	No. of employees	Average personnel cost per employee (R'000)
Programme 1: Administration	68,851	40,844	59.32%	44	928
Programme 2: Earth Observation	66,699	23,963	35.93%	26	922
Programme 3: Space Science	64,553	40,139	61.18%	73	550
Programme 4: Space Operations	91,548	41,125	44.92%	56	734
Programme 5: Space Engineering	7,042	7,026	99.77%	4	1 757
Total (R'000)	298,693	153,097	51.26%	203	4,754

Table 25: Personnel Cost by Programme

TRAINING COSTS

Programme	Total Personnel Expenditure (R'000)	Total Training Expenditure (R'000)	Training Expenditure as a % of Personnel Total Expenditure	No. of Employees Trained	Average Training Cost per Employee (R'000)
Programme 1: Administration & Programme 5: Space Engineering	47,870	1,613	3.37%	58	34
Programme 2: Earth Observation	23,963	172	0.72%	28	6
Programme 3: Space Science	40,139	273	0.68%	77	4
Programme 4: Space Operations	41,125	290	0.71%	40	7
Total (R'000)	153,097	2 348	1.53%	193	12

Table 26: Training Costs

EMPLOYMENT AND VACANCIES PER PROGRAMME

Programme	2020/21 No. of employees	2021/22 Approved Posts	2021/22 No. of Employees	2021/22 Vacancies	% of Vacancies
Administration	43	52	44	13	25%
Earth Observation	5	41	4	37*	90%
Space Science	22	46	26	20	43%
Space Operations	66	110	73	38	35%
Space Engineering	57	58	56	2	3%
Total	193	307	203	110	37%

Table 27: Employment and Vacancies per Programme

* Related to the Space Engineering capacitation plan aimed at supporting key projects such as AIT / Houwteq

Budget constraints are still a reality in terms of filling vacancies. There were nine (9) new appointments, and ten (10) terminations during the quarter. The overall number of employees have grown from 193 at the beginning of the year to 203 by end of March 2022. Recruitment processes relating to the vacant Executive positions are in progress, and more recruitment is expected in the new financial year.

EMPLOYMENT CHANGES PER EMPLOYEE LEVEL

Salary Band	Employment as at 31 December 2021	Appointments	Terminations	Employment at end of the period 31 March 2022
Top Management	1	0	1	0
Senior Management	5	0	2	3
Professional qualified	63	2	3	62
Skilled	106	7	3	110
Semi-skilled	23	0	0	23
Unskilled	6	0	1	5
Total	204	9	10	203

Table 28: Employment Changes by Salary Band

REASON FOR EMPLOYEES LEAVING

Reason	Number	% of Total no. of employees leaving
Death	0	0%
Resignation	3	1%
Dismissal	0	0%
Retirement	0	0%
Ill health	0	0%
Expiry of contract	7	3%
Other	0	0%
Total	10	5%

Table 29: Reason for Employees Leaving

LABOUR RELATIONS:

MISCONDUCT AND DISCIPLINARY ACTION

Nature of Disciplinary Action	Number
Verbal Warning	2
Written Warning	1
Final Written Warning	2
Dismissal	0
Total	5

Table 30: Labour Relations: Misconduct and disciplinary action

EMPLOYMENT EQUITY STATUS

Occupational Levels	Male				Female				Foreign Nationals		
	A	C	I	W	A	C	I	W	Male	Female	Total
Top management (Including Board Members)	1	0	1	1	6	0	1	0	0	0	10
Senior management SANSA Consolidated)	0	0	0	1	1	0	0	1	0	0	3
Professionally qualified and experienced specialists and mid-management (SANSA)	12	3	6	11	14	0	2	4	2	0	54
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents (SANSA)	34	6	3	8	36	6	1	7	0	0	101
Semi-skilled and discretionary decision making (SANSA)	6	1	0	1	6	1	0	0	0	0	15
Unskilled and defined decision making	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERMANENT	52	10	9	21	57	7	3	12	2	0	173
Temporary employees	7	0	0	9	10	1	0	3	0	0	30
GRAND TOTAL	59	10	9	30	67	8	3	15	2	0	203
Employees with disabilities (Permanent)	0	0	1	0	1	0	0	0	0	0	2
Employees with disabilities (Temporary)	0	0	0	0	0	0	0	0	0	0	0
Total Employees with disabilities	0	0	1	0	1	0	0	0	0	0	2

Table 31: Employment Equity Status

PART E:

FINANCIAL INFORMATION

INDEPENDENT AUDITOR'S REPORT TO PARLIAMENT ON SOUTH AFRICAN NATIONAL SPACE AGENCY

Report on the audit of the financial statements

OPINION

1. We have audited the financial statements of the South African National Space Agency set out on pages 14 to 72, which comprise the statement of financial position as at 31 March 2022, the statement of financial performance, statement of changes in net assets and cash flow statement and statement of comparison of budget and actual amounts for the year then ended, as well as notes to the financial statements, including a summary of significant accounting policies.

2. In our opinion, the financial statements present fairly, in all material respects, the financial position of the South African National Space Agency as at 31 March 2022, and its financial performance and cash flows for the year then ended in accordance with South African Standards of Generally Recognised Accounting Practice (SA Standards of GRAP) and the requirements of the Public Finance

Management Act of South Africa, 1999 (Act No.1 of 1999) (PFMA).

BASIS FOR OPINION

3. We conducted our audit in accordance with the International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the auditor's responsibilities for the audit of the financial statements section of our report.

4. We are independent of the entity in accordance with Independent Regulatory Board for Auditors' Code of Professional Conduct for Auditors (IRBA Code) and other independence requirements applicable to performing audits of financial statements in South Africa. We have fulfilled our other ethical responsibilities in accordance with the IRBA Code and in accordance with other ethical requirements applicable to

performing audits in South Africa. The IRBA Code is consistent with the corresponding sections of the International Ethics Standards Board for Accountants' International Code of Ethics for Professional Accountants (Including International Independence Standards).

5. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

RESPONSIBILITIES OF ACCOUNTING AUTHORITY FOR THE FINANCIAL STATEMENTS

6. The Board, which constitutes the accounting authority is responsible for the preparation and fair presentation of the financial statements in accordance with SA Standards of GRAP and the requirements of the PFMA and for such internal control as the accounting authority determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

7. In preparing the financial statements, the accounting authority is responsible for

assessing the entity's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the accounting authority either intends to liquidate the entity or to cease operations, or has no realistic alternative but to do so.

AUDITOR'S RESPONSIBILITIES FOR THE AUDIT OF THE FINANCIAL STATEMENTS

8. Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

9. A further description of our responsibilities for the audit of the financial statements is included in the annexure to this auditor's report.

REPORT ON THE AUDIT OF THE ANNUAL PERFORMANCE REPORT

INTRODUCTION AND SCOPE

10. In accordance with the Public Audit Act 25 of 2004 (PAA) and the general notice issued in terms thereof, we have a responsibility to report on the usefulness and reliability of the reported performance information against predetermined objectives for selected outcomes presented in the annual performance report. We performed procedures to identify material findings but not to gather evidence to express assurance.

11. Our procedures address the usefulness and reliability of the reported performance information, which must be based on the entity's approved performance planning documents. We have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. Our procedures do not examine whether the actions taken by the entity enabled service delivery. Our procedures do not extend to any disclosures or assertions relating to the extent of achievements in the current year or planned performance strategies and information in respect of future periods that may be included as part of the reported performance information. Accordingly, our findings do not extend to these matters.

12. We evaluated the usefulness and reliability of the reported performance information in accordance with the criteria developed from the performance management and reporting framework, as defined in the general notice, for the following selected Outcome presented in the annual performance report of the entity for the year ended 31 March 2022:

PROGRAMMES/ OBJECTIVES	PAGES IN THE ANNUAL PERFORMANCE REPORT
Outcome 4: SANSA re-positioned as a key enabler of government's space related policies	46-50

13. We performed procedures to determine whether the reported performance information was properly presented and whether performance was consistent with the approved performance planning documents. We performed further procedures to determine whether the indicators and related targets were measurable and relevant, and assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.

14. We did not raise any material findings on the usefulness and reliability of the reported performance information for the following Outcome:

- **Outcome 4:** SANSA re-positioned as a key enabler of government's space related policies

OTHER MATTER

15. We draw attention to the matter below. Our opinion is not modified in respect of this matter.

Achievement of planned targets

16. Refer to the annual performance report on pages 46 to 50 for information on the achievement of planned targets for the year and explanations provided for the under/ over achievement of targets.

REPORT ON THE AUDIT OF COMPLIANCE WITH LEGISLATION

INTRODUCTION AND SCOPE

17. In accordance with the PAA and the general notice issued in terms thereof, we have a responsibility to report material findings on the entity's compliance with specific matters in key legislation. We performed procedures to identify findings but not to gather evidence to express assurance.

18. We did not identify any material findings on compliance with the specific matters in key legislation set out in the general notice issued in terms of the PAA.

OTHER INFORMATION

19. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report. The other information does not

include the financial statements, the auditor's report and the selected outcome presented in the annual performance report that have been specifically reported in this auditor's report.

20. Our opinion on the financial statements and my findings on the reported performance information and compliance with legislation do not cover the other information and we do not express an audit opinion or any form of assurance conclusion thereon.

21. In connection with our audit, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements and the selected outcome presented in the annual performance report, or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

22. If based on the work we have performed, we conclude that there is a material misstatement in this other information, we are required to report that fact. I have nothing to report in this regard.

INTERNAL CONTROL DEFICIENCIES

23. We considered internal control relevant to our audit of the financial statements, reported performance information and compliance with applicable legislation; however, our objective was not to express any form of assurance on it. We did not identify any significant deficiencies in internal control.

OTHER REPORTS

24. We draw attention to the following engagement conducted by various parties that have or could potentially have an impact on the entity's financial statements, reported performance information and compliance with applicable legislation and other related matters. The reports noted do not form part of our opinion on the financial statements or our findings on the reported performance information or compliance with legislation.

AUDIT-RELATED SERVICES

25. An agreed-upon procedures engagement was performed on donor funding concerning the application of grant funding received from the National Research Foundation (NRF) for the period 1 January 2021 to 31 December 2021 and was issued to the South African National Space Agency management on the 15 June 2022.

AUDITOR TENURE

26. In terms of the IRBA rule published in Government gazette number 39475 dated 4 December 2015, we report that Nexia SAB&T has been the auditor of the South African National Space Agency for 5 years.



Nexia SAB&T

Per: A Darmalingam Director
Registered Auditor

29 July 2022

119 Witch-Hazel Avenue Highveld Technopark Centurion

ANNEXURE – AUDITOR'S RESPONSIBILITY FOR THE AUDIT

1. As part of an audit in accordance with the ISAs, we exercise professional judgement and maintain professional scepticism throughout our audit of the financial statements, and the procedures performed on the reported performance information for selected outcome and on the entity's compliance with respect to the selected subject matters

FINANCIAL STATEMENTS

2. In addition to our responsibility for the audit of the financial statements as described in this auditor's report, we also:

- Identify and assess the risks of material misstatement of the financial statements whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk

of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board, which constitutes the accounting authority.
- Conclude on the appropriateness of the Board, which constitutes the accounting authority's use of the going concern basis of accounting in the preparation of the financial statements. We also conclude, based on the audit evidence obtained, whether a material uncertainty exists

relating to events or conditions that may cast significant doubt on the ability of South African National Space Agency's to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements about the material uncertainty or, if such disclosures are inadequate, to modify our opinion on the financial statements. Our conclusions are based on the information available to us at the date of this auditor's report. However, future events or conditions may cause an entity to cease operating as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and determine whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

COMMUNICATION WITH THOSE CHARGED WITH GOVERNANCE

3. We communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

ANNUAL FINANCIAL STATEMENTS

STATEMENT OF FINANCIAL POSITION AT 31 MARCH 2022

	Note	2022	2021
		R	R
ASSETS			
Current Assets		331,270 520	286,915 597
Cash and Cash Equivalents	5	310,591,650	261,845,641
Receivables from Exchange Transactions	6	20,141,704	24,663,464
Inventory	7	537,166	406,492
Non-Current Assets		506,003,240	480,223 ,46
Property, Plant and Equipment	8	490,390,183	464,908,381
Intangible Assets	9	15,683,056	15,314,665
Total Assets		837,237,760	767,138,643

LIABILITIES

Current Liabilities		173,863,387	138,095,338
Trade and Other Payables from Exchange Transactions	10	36,988,142	25,951,086
Provisions	11	22,599,691	10,774,988
Conditional Grants	12	114,147,177	101,201,546
Operating Lease Liability	14	128,377	167,718
Total Liabilities		173 863 387	138 095 338

NET ASSETS

NET ASSETS		663,410,373	629,043,305
Accumulated Surplus		663,410,373	629,043,305
Total Net Assets		663,410,373	629,043,305

STATEMENT OF FINANCIAL PERFORMANCE FOR THE YEAR ENDED 31 MARCH 2022

	Note	2022	2021
		R	R
REVENUE			
Revenue from Non-Exchange Transactions			
Transfers and Grants	13	249,755,894	200,771,668
Revenue from Exchange Transactions		505,718,165	480,223,046
Interest	15	4,705,800	4,421,044
Rendering of Services	16	75,000,495	75,641,739
Other Income	17	3,232,569	1,701,946
Impairment Reversal of Accounts Receivable	29	80,813	-
Total Revenue		332,775,571	282,536,397

EXPENDITURE

Employee Related Cost	18	153,097,209	130,543,992
Board Member Remuneration	19	1,155,911	810,044
Depreciation and Amortisation	20	21,616,564	24,138,519
Repairs and Maintenance	8	11,766,141	10,653,754
Data Licence fees	21	5,681,555	29,314,713
Student Bursaries and Research Grants	22	30,901,077	7,318,282
Antenna Infrastructure Services	23	8,322,036	4,131,869
Training Expenses	24	2,348,188	2,031,192
General Expenses	25	61,509,156	49,375,150
Net Losses on Foreign Exchange Transactions	26	598,707	1,410,961
Net Losses on Disposal of Property, Plant and Equipment	27	1,411,960	194,024
Impairment of Accounts Receivable	29	-	3,179,627
Total Expenditure		298,408,503	263,102,127
SURPLUS FOR THE YEAR		34,367,067	19,434,270

STATEMENT OF CHANGES IN NET ASSETS FOR THE YEAR ENDED 31 MARCH 2022

DESCRIPTION	ACCUMULATED SURPLUS
	R
2021	
Balance at 01 April 2020	663,125,035
Surplus for the year	19,434,270
Balance as at 31 March 2021	629,043,305
2022	
Balance at 01 April 2021	629,043,305
Surplus for the year	34,367,067
Balance at 31 March 2022	663,410,373

CASH FLOW STATEMENT FOR THE YEAR ENDED 31 MARCH 2022

	Note	2022	2021
		R	R
CASH FLOWS FROM OPERATING ACTIVITIES			
RECEIPTS			
Transfers and Grants		262,701,525	209,250,250
Sales of goods and services		79,603,068	88,830,704
Interest	15	4,705,800	4,421,044
Other Receipts	17	3,232,567	1,701,946
PAYMENTS			
Employee Related Costs		(142,428,417)	(122,713,583)
Suppliers		(110,259,816)	(107,894,313)
NET CASH FLOWS FROM OPERATING ACTIVITIES	28	97,554,727	73,596,049

CASH FLOWS FROM INVESTING ACTIVITIES

Acquisition of Property, Plant and Equipment	8	(46,937,193)	(13,697,396)
Proceeds on Sale of Property, Plant and Equipment		4 227	370,359
Acquisition of Intangible Assets	9	(1,875,752)	(1,443,275)
Net cash flows from investing activities		(48,523,644)	(14,770,312)
Net increase in Cash And Cash Equivalents		48,746,009	58,825,737
Cash and Cash Equivalents at the beginning of the year		261,845,641	261,845,641
Cash and Cash Equivalents at the end of the year	5	310,591,650	310,591,650

STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS FOR THE YEAR ENDED 31 MARCH 2022

	Note	Approved Budget	Final Budget	Actual Amounts on a Comparable Basis	Difference
		2021/22	2021/22	2021/22	2021/22
Revenue		R	R	R	R
Revenue from Non-exchange Transactions		284,946,570	344,580,752	249,755,894	(94,824,859)
Operational Transfers		181,283,000	181,283,000	181,283,000	-
Conditional Transfers	4.3.1	99,395,849	149,791,947	58,948,220	(90,843,727)
Research Grants	4.3.2	1,160,695	7,925,805	3,825,806	(4,099,999)
Post graduate student bursary support		3,107,026	5,580,000	5,698,867	118,867

	Note	Approved Budget	Final Budget	Actual Amounts on a Comparable Basis	Difference
		2021/22	2021/22	2021/22	2021/22
Revenue		R	R	R	R
Revenue from Exchange Transactions		75,606,753	68,059,089	75,000,496	6,941,406
Contract Income: Public	4.3.3	20,276,238	20,770,753	16,710,065	(4,060,688)
Contract Income: Private	4.3.4	5,712,998	5,435,970	6,451,181	1,015,211
Contract Income: Foreign	4.3.5	49,617,517	41,852,366	51,839,249	9,986,883
Other Income	4.3.6	3 286 168	3 286 168	7,938,369	4,652,201
Prior years Surplus Retained		-	142,164,570	142,164,570	-
Total Revenue		363,839,491	558,090,579	474,859,328	(83 231 252)

	Note	Approved Budget	Final Budget	Actual Amounts on a Comparable Basis	Difference
Expenditure		2021/22	2021/22	2021/22	2021/22
Current Payments		R	R	R	R
Employee Related Costs	4.3.7	164,161,469	161,255,638	153,097,209	8,158,429
Board Member Remuneration		813,116	1,117,500	1,155,911	(38,411)
Depreciation and Amortisation		-	-	21,616,564	(21,616,564)
Repairs and Maintenance	4.3.8	13,170,112	17,166,445	11,766,141	5,400,304
Data Licence fees	4.3.9	37,190,401	21,690,401	5,681,555	16,008,846
Student Bursaries and Research Grants Paid	4.3.10	19,321,043	41,095,673	30,901,077	10,194,596
Antenna Infrastructure Services	4.3.11	-	7,088,970	8,322,036	(1,233,066)
Training Expenses	4.3.12	3,323,994	7,206,381	2,348,188	4,858,193
General Expenses	4.3.13	78,306,980	114,809,488	61,509,156	53,300,332
Net Losses on Foreign Exchange Transactions		-	4,909	598,707	(593,798)
Net Losses on Disposal of Property, Plant and Equipment		-	-	1,411,960	(1,411,960)
		316,287,115	371,435,405	298,408,503	73,026,902

	Note	Approved Budget	Final Budget	Actual Amounts on a Comparable Basis	Difference
Payments for Capital Assets					
		R	R	R	R
Machinery and equipment	4.3.14	16,214,259	48,116,861	16,002,105	32,114,756
Software and intangible assets	4.3.15	2,868,617	6,273,928	1,875,752	4,398,176
Vehicles	4.3.16	-	2,492,401	297,400	2,195,001
Buildings and other fixed structures	4.3.17	-	36,007,210	21,129,309	14,877,901
AIT Facility	4.3.18	20,910,000	59,657,870	-	59,657,870
Furniture and Fittings		-	2,137,299	1,753,534	383,765
Computer Equipment	4.3.19	7,559,500	30,855,328	7,719,182	23,136,146
Office furniture		-	-	35,663	(35,663)
Satellite Development	4.3.20	-	1,114,277	-	1,114,277
		47,552,376	186,655,174	48,812,945	137,842,229
Total Expenditure		363,839,491	558 090 579	347,221,449	210 869 130
Surplus/Deficit		-	-	127,637,878	127 637 878

RECONCILIATION OF ACTUAL AMOUNTS ON A COMPARABLE BASIS AND ACTUAL AMOUNTS ON THE ANNUAL FINANCIAL STATEMENTS

Net Cash flows from	Operating Activities	Financing Activities	Investing Activities	Total
		2021/22	2021/22	2021/22
		R	R	R
Budget and Actual Comparative Statement	176,165,750	-	(35,663)	176,130,089
Basis Differences	(78,896,098)	-	(48,487,980)	(127,384,078)
Timing Differences	-	-	-	-
Entity Differences	-	-	-	-
Actual amount in Cash Flow Statement	97,269,652	-	(48,523,644)	48,746,009

NOTES TO THE FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 MARCH 2022

1 .GENERAL INFORMATION

Domicile	South Africa
Nature of business and principal activities	The South African National Space Agency (SANSA) is mandated by the SANSA Act, 36 of 2008 and is South Africa's government body for the promotion and use of space. It also fosters cooperation in space-related activities and research in space science, seeks to advance scientific engineering through human capital, and supports the creation of an environment conducive to the industrial development of space technologies within the framework of national government.
Legal form of entity	Schedule 3A Public entity, as defined by the Public Finance Management Act (Act No. 1 of 1999 as amended by Act No. 29 of 1999).
Executive authority	Minister of the Department of Science and Innovation
Board members	<p>Appointed 1 September 2018</p> <ul style="list-style-type: none"> • Ms. X Kakana (Chairman of the Board) • Mr. E Jansen - Resigned November 2021 • Ms. N. Majaja (Chairman of Human Resources, Social and Ethics Committee) • Adv. I Kealotswe-Matlou • Ms. M Mfeka • Ms. L Msibi • Dr. V Munsami (Chief Executive Officer) - Resigned February 2022 • Prof. A Muronga (Chairman of Strategy and Investment Committee) - Appointed February 2022 • Mr. A Naidoo • Mr. J Prinsloo (Chairman of Strategy and Investment Committee) - Resigned February 2022 • Ms. M Paul • Ms. I Pule (Chairman of Audit and Risk Committee) • Mr. W Van Biljon • Ms. A Mlisa (Acting Chief Executive Officer) - Appointed March 2022

Business address	Enterprise Building, Innovation Hub Mark Shuttleworth street, Innovation Hub Pretoria Gauteng, South Africa
Postal address	PO Box 484, Silverton 0127, Gauteng, South Africa
Auditor	Nexia SAB&T (012) 682 8800 119 Witch-Hazel Avenue Highveld Technopark, Centurion

2 . BASIS OF PRESENTATION

The Annual Financial Statements have been prepared in accordance with the Standards of Generally Recognised Accounting Practice (GRAP), including any interpretations and directives issued by the Accounting Standards Board (ASB) and the Public Finance Management Act (PFMA).

The historic cost convention has been used, except where indicated otherwise. The presented Annual Financial Statements have been rounded to the nearest Rand value. These accounting policies are consistent with the previous period.

2.1. SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY

In the application of the entity's accounting policies, which are described below, management is required to make judgements, estimates and assumptions about the amounts of assets, liabilities, revenue and expenses that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

These estimates and underlying assumptions are reviewed on an on-going basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

The following are the significant judgements that management have made in the process of applying the entity's Accounting Policies and have the most significant effect on the amounts recognised in the Annual Financial Statements: Significant accounting policies, which have been consistently applied, are disclosed below. Details of any changes in accounting policies are explained in the relevant policy.

2.2 . DEPRECIATION AND AMORTISATION

Determination of Useful Lives for Property, Plant and Equipment

In determining the useful lives of items of property, plant and equipment, consideration is given to the physical condition and the depreciation period of replacing the assets. The assets that exceeded the industry norm's useful lives are re-assessed for physical

condition and the estimated remaining useful lives for future use is assessed.

2.2.1. FINANCIAL ASSETS AND LIABILITIES

The classification of financial assets and liabilities, into categories, is based on the relevant GRAP standards and the terms of the instruments. Accounting Policy 2.3.1 on Financial Assets Classification and Accounting Policy 2.3.2 on Financial Liabilities Classification describe the factors and criteria considered by the management of the entity in the classification of financial assets and liabilities.

In making the above-mentioned judgement, management considered the definition and recognition criteria for the classification of financial instruments as set out in GRAP.

2.2.2. IMPAIRMENT OF FINANCIAL ASSETS

Accounting Policy 2.7.5 on Impairment of Financial Assets describes the process followed to determine the value by which financial assets should be impaired. In making the estimation for impairment, management of the entity considered the detailed criteria for impairment of financial assets as set out in GRAP, and the judgement used are mainly based on market conditions existing at the end of the reporting period. Management of the entity is satisfied that impairment of financial assets recorded during the year is appropriate.

Calculation in respect of impairment of debtors is based on an assessment of the extent to which debtors have defaulted on payments already due, and an assessment of their ability to make payments based on their creditworthiness.

2.2.3. USEFUL LIVES OF PROPERTY, PLANT AND EQUIPMENT AND INTANGIBLE ASSETS

Property, plant and equipment and intangible assets are depreciated over their useful life taking into account residual values, where appropriate. The useful lives of the assets and residual values are assessed annually and may vary depending on a number of factors. In re-assessing useful lives, factors such as technological innovation and maintenance programmes are taken into account. Residual value assessments consider issues such as future market conditions, the remaining life of the asset and projected disposal values

2.2.4. IMPAIRMENT: WRITE DOWN OF PROPERTY, PLANT AND EQUIPMENT AND INTANGIBLE ASSETS

Property, plant and equipment and intangible assets are considered for impairment if there is a reason to believe that impairment may be necessary. The future cash flows expected to be generated by the assets are projected taking into account market conditions and the expected useful lives of the assets. The present value of these cash flows, determined using an appropriate discount rate, is compared to the current carrying value and, if lower, the assets are impaired to the present value taking into account the reasonable cost of replacement.

In making the above-mentioned estimates and judgement, management considered the subsequent measurement criteria and indicators of potential impairment losses as set out in GRAP 17: Property, Plant and Equipment and GRAP 31: Intangible assets. In particular, the calculation of the recoverable service

amount for PPE and intangible assets involves significant judgment by management.

2.2.5. PROVISIONS AND CONTINGENT LIABILITIES / ASSETS

Management judgement is required when recognising and measuring provisions and when measuring contingent liabilities. Provisions are discounted where the effect of discounting is material using actuarial valuations. The amount of a provision is the best estimate of the expenditure expected to be required to settle the present obligation at the reporting date. SANSA recognises provision for bonuses based on the expected performance bonuses to be paid out to employees.

2.2.6. DETERMINATION OF ADEQUACY OF LEAVE PAY PROVISION

The leave pay provision is based on actual days leave due to employees at their rate of remuneration. Remuneration increases take effect annually at the beginning of the

financial year. In determining the provision, it is assumed that no leave will be forfeited. The assumption is based on past history.

2.2.7. REVENUE RECOGNITION

Accounting Policy 2.9.1 on Revenue from Exchange Transactions and Accounting Policy 2.9.2 on Revenue from Non-exchange Transactions describe the conditions under which revenue will be recorded by management of the entity.

In making their judgement, management considers the detailed criteria for the recognition of revenue as set out in GRAP 9: Revenue from Exchange Transactions and GRAP 23: Revenue from Non-Exchange transactions, as far as Revenue from Exchange and Non-Exchange Transactions is concerned. In particular, revenue from services rendered is recognised in surplus or deficit in proportion to the stage of completion of the transaction at the reporting date.

2.3. FINANCIAL INSTRUMENTS

2.3.1 Financial Assets - Classification

The entity has the following types of financial assets as reflected on the face of the Statement of Financial Position or in the notes thereto:

Type of Financial Asset	Classification
Receivables from Exchange Transactions	Financial Assets at Amortised Cost

2.3.2 FINANCIAL LIABILITIES - CLASSIFICATION

The entity has the following types of financial liabilities as reflected on the face of the Statement of Financial Position or in the notes thereto:

Type of Financial Asset	Classification
Payables from Exchange Transactions	Financial Liabilities at Amortised Cost

2.3.3 INITIAL AND SUBSEQUENT MEASUREMENT

Financial Assets:

Subsequent to initial recognition, financial assets are measured at amortised cost.

Financial Liabilities:

Subsequent to initial recognition, financial liabilities are measured at amortised cost.

2.3.4. IMPAIRMENT OF FINANCIAL ASSETS

Financial assets are impaired where there is objective evidence of impairment of financial assets (such as the probability of insolvency or significant financial difficulties of the debtor). The loss on financial assets is determined as a difference between the carrying amount and the present value of the estimated future cash flow.

FINANCIAL ASSETS CARRIED AT AMORTISED COST

Financial assets that are carried at amortised cost encompass accounts receivables and cash and cash equivalents. An estimate is made for doubtful debt based on past default experience of all outstanding amounts at year-end. Bad debts are written off the year in which they are identified as irrecoverable.

An allowance for impairment of accounts receivables is established when there is objective evidence that the entity will not be able to collect all amounts due according to the original terms of receivables. The allowance is made whereby the recoverability of accounts receivable is assessed individually and then collectively after grouping the assets in financial assets with similar credit risk characteristics. The amount of the allowance is the difference between the financial asset's carrying amount and the present value of estimated future cash flows, discounted at the original effective interest rate. Future cash flows in a group of financial assets that are collectively evaluated for impairment are estimated on the basis of historical loss experience for assets with credit risk characteristics similar to those in the group. The entity uses an allowance account to record impairment losses.

2.4. INVENTORY

The entity uses the weighted average costing method to account for inventory. Inventories are valued at the lower of cost price or net realisable value. The net realisable value is the estimated selling price in the ordinary course of business, less the estimated or selling costs.

The cost of inventories comprises of all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition.

The amount of any write-down of inventories to net realisable value and all losses of inventories are recognised as an expenditure in the period the write-down or loss occurs.

2.5. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are measured at cost, net of accumulated depreciation and/ or accumulated impairment losses. Depreciation is recognised in surplus or deficit on a straight line basis over the estimated useful lives of each part of an item of property, plant and equipment. SANSA's accounting policy is to depreciate assets as follows:

Asset Class	Years
Freehold Land	
Land	Indefinite
Freehold Buildings	
Buildings	15 - 50
Alterations and Other Fixtures	14 - 15
Leasehold Improvements	
Improvements	5 - 20

Asset Class	Years
Other	
Computer Equipment	1 - 5
Motor Vehicles	3 - 7
Office Equipment	3 - 15
Office Furniture	3 - 15
Research and Laboratory Equipment	2 - 15

The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item

2.5.1. IMPAIRMENT OF NON-FINANCIAL ASSETS

Cash generated units are determined as the smallest identified group of assets which can generate cash flows independently from other assets or groups of assets. Non-cash generating assets are assets. Non-cash generating assets are primarily held for internal service delivery purposes.

If there is any indication that an asset may be impaired, the recoverable service amount is estimated for the individual asset. For cash-generating assets, if it is not possible to estimate the recoverable amount of the individual asset, the recoverable amount of the cash generating unit to which the

asset belongs is determined. If the recoverable service amount of an asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable service amount. That reduction is an impairment loss, and recognised in Surplus or Deficit.

If there is any indication that an asset may no longer be impaired, the recoverable service amount is estimated for the individual asset. For cash-generating assets, if it is not possible to estimate the recoverable amount of the individual asset, the recoverable amount of the cash generating unit to which the asset belongs is determined. If the recoverable service amount of an asset is more than its carrying amount, the carrying amount of the asset is increased but does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods. That

reversal of an impairment loss is recognised in Surplus or Deficit of the asset is reduced to its recoverable service amount. That reduction is an impairment loss, and recognised in Surplus or Deficit.

The gain or loss, which is the difference between the proceeds on disposal and the carrying amount, arising from the derecognition of an item of Property, Plant and Equipment is included in Surplus or Deficit when the item is derecognised.

2.6. INTANGIBLE ASSETS

Intangible assets are stated at cost, being the initial cost less any accumulated amortisation and impairment losses. Amortisation is charged to surplus or deficit so as to write off the cost of intangible assets over their estimated useful lives, using the straight-line method as follows:

Asset Class	Years	Asset Class	Years
Computer Software	3 - 10	Intellectual Property	1 -40

The surplus or deficit arising from the derecognition of an item of intangible assets is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

2.7 PROVISIONS

Provisions are reviewed at reporting date and the amount of a provision is the present value of the expenditure expected to be required to settle the obligation. When the effect of discounting is material, provisions are determined by discounting the expected future cash flows that reflect current market assessments of the time value of money at a rate adjusted for the specific risks of a liability. The impact of the periodic unwinding of the discount is recognised in surplus or deficit as a finance cost as it occurs.

2.8 LEASES

2.8.1 Operating Leases

The entity recognises operating lease rentals as an expenditure in surplus or deficit on a straight-line basis over the term of the relevant lease. The difference between the amounts recognised as an expenditure and the contractual payments are recognised as an operating lease asset or liability.

2.9 REVENUE RECOGNITION

2.9.1 Revenue from Exchange Transactions

2.9.1.1 Finance income

Interest earned on investments is recognised in surplus or deficit on a time proportionate basis that takes into account the effective yield on the investment.

2.9.1.2 Rendering of Services

Rendering of Services constitute revenue which arises from service delivery to customers measured at using the stage of completion method.

The stage of completion is assessed by reference to work performed as at the reporting date. Contract revenue includes the initial amount agreed in the contract plus any variations in contract work, claims and incentive payments to the extent that it is probable that these will result in revenue and can be measured reliably. As soon as the outcome of a contract can be estimated reliably, contract

revenue and expenses are recognised in surplus or deficit in proportion to the stage of completion of the contract.

When the outcome of a contract cannot be estimated reliably, contract revenue is recognised only to the extent of contract costs incurred that are likely to be recoverable. An expected loss on a contract is recognised immediately in surplus or deficit.

2.9.2 Revenue from Non-exchange Transaction

2.9.2.1 Government Grants / Subsidies

Conditional Grants and Receipts

Income received from conditional grants, donations and funding are recognised as revenue to the extent that the entity has complied with all of the criteria, conditions or obligations embodied in the agreement. To the extent that the criteria, conditions or obligations have not been met a liability is recognised.

Unconditional Grants and receipts

Government grants that are receivable as compensation for expenditure or losses already incurred or for the purpose of giving immediate financial support to the entity with no future related costs are recognised in surplus or deficit in the period in which they become receivable.

Unconditional Grants and Receipts

Government grants that are receivable as compensation for expenditure or losses already incurred or for the purpose of giving immediate financial support to the entity with no future related costs are recognised in surplus or deficit in the period in which they become receivable.

2.10 FOREIGN CURRENCIES

Transactions in foreign currencies are initially recorded at the prevailing exchange rate on the dates of the transactions.

Monetary assets and liabilities denominated in such foreign currencies are translated to the functional currencies at the rates prevailing at the reporting date. Exchange differences are included in surplus or deficit.

2.11 EMPLOYEE BENEFITS

2.11.1 Short-term Employee Benefits

The costs of all short-term employee benefits such as leave pay and bonus are recognised during the period in which the employee renders the related service. The liability for leave pay is based on the total accrued leave days at year end and is shown as a creditor in the Statement of Financial Position. The entity recognises the expected cost of performance

bonuses only when the entity has a present legal or constructive obligation to make such payment and a reliable estimate can be made.

2.12 IRREGULAR EXPENDITURE

Irregular expenditure is expenditure that is contrary to the Public Finance Management Act (Act No 56 of 2003) and is in contravention of any legislation. Irregular expenditure excludes unauthorised expenditure. All expenditure relating to irregular expenditure is recognised as an expense in the Statement of Financial Performance in the year that expenditure was incurred. Expenditure is classified in accordance with the nature of the expense, and where recovered, it is subsequently accounted for as revenue in the Statement of Financial Performance.

2.13 FRUITLESS AND WASTEFUL EXPENDITURE

Fruitless and wasteful expenditure is expenditure that was made in vain and would have been avoided had reasonable care been exercised. Fruitless and wasteful expenditure is accounted for as expenditure in surplus or deficit.

2.14 BUDGET INFORMATION

Financial Statements are prepared on accrual basis whilst the budget is prepared on a cash basis of accounting. A reconciliation between the surplus/(deficit) for the period as per the Statement of Financial Performance and budgeted surplus/(deficit) is included in the Statement of Comparison of Budget and Actual Amounts. At the end of September each year the budget may be revised if necessary due to changes in the operations of the entity which require a reallocation of resources. All budget changes are approved by the board of directors prior to the implementation of the revised budget.

3. SEGMENT INFORMATION

General information about segments

The entity is organised and reports on a basis of four business units comprising of five functional areas: the corporate support programme, the earth observation programme, the space science programme, the space operations programme and the space engineering programme. The programmes were organised around the type of services provided and the related space science fields. Management used the same segments for determining and delivering on its strategic objectives. The space engineering programme is aggregated into the corporate programme for reporting purposes. It is not an operation on its own but a business unit within the corporate programme overseeing key projects across the divisions.

The Corporate Support Programme 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.

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

The Earth Observations Programme is responsible for the collection, processing, archiving and distribution of Earth observation data and data products for societal benefit. SANSA maintains an Earth observation portfolio

of sensors, provides an R&D platform in Earth observation technologies, conducts satellite image processing, and correction and provides human capital development in Earth Observation and science advancement.

The Space Science Programme leads multidisciplinary space science. Key functions include fundamental and applied science research, the support of space facilitated science through science data acquisition, the coordination and administration of scientific data ground segments, provision of space weather and other geo-space products and services on a commercial and private basis. The programme also provides leadership in postgraduate science student training, as well as science engagement support.

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

3.1 Segmented Financial Performance

2022	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
REVENUE						
Revenue from Non - Exchange Transactions						
Transfers and Subsidies Received	66 339 082	63,668,587	19,598,656	82 809 799	17 339 769	249 755 894
Revenue from Exchange Transactions						
Interest Income	3 106 064	56 248	1 054 650	488 838	-	4 705 800
Other Income	874	7 778	2 771 313	452 605	-	3 232 569
Rendering of Services	-	4 478 252	62 647 881	7 874 362	-	75 000 495
Impairment Reversal of Accounts Receivable	-	80 364	449	-	-	80 813
Total Revenue	69 446 020	68 291 229	86 072 948	91 625 604	17 339 769	332 775 570

2022	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
EXPENDITURE						
Employee Related Costs	40 843 901	23 963 470	41 125 032	40 138 684	7 026 122	153 097 209
Board Member Remuneration	1 155 911	-	-	-	-	1 155 911
Depreciation and Amortisation	1 426 734	1 680 401	13 084 925	5 24 503	-	21 616 564
Repairs and Maintenance	284 309	2 503 403	6 005 257	2 973 171.3	-	11 766 141
Data Licence fees	-	5 681 555	-	-	-	5 681 555
Student Bursaries and Research Grants Paid	-	24 442 996	-	6 458 081	-	30 901 077
Antenna Infrastructure Services	-	-	8 322 036	-	-	8 322 036
Training Expenses	1 613 456	171 820	290 091	272 820	-	2 348 188
General Expenses	23 428 622	7 620 070	21 215 983	9 228 981	15 500	61 509 156
Net Losses on Foreign Exchange Transactions	58 495	332 480	207 596	136	-	598 707
Net Losses on Disposal of Property, Plant and Equipment	39 606	18 077	1 297 282	56 994	-	1 411 960
Total Expenditure	68 851 034	66 699 347	91 548 203	64 553 372	7 041 622	298 408 503
Surplus (Deficit) for the year	594 986	1 591 882	(5 475 255)	27 072 233	10 298 147	34 367 067

2022	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
ASSETS						
Non-current - Segment assets	325 388 692	25 476 392	103 476 018	51 377 063	-	506 003 240
Current - Segment assets	188 926 710	4 784 994	61 484 329	76 074 487	-	331 270 520
Total Segment assets	514 315 402	30 261 386	164 960 347	127 451 550	-	837 273 760
Liabilities						
Non - current Segment Liabilities	-	-	-	-		173 863 393
Current Segment Liabilities	(147 109 613)	98 815 321	115 581 778	105 707 935	867 971	173 863 393
Total Segment Liabilities	(147 109 613)	98 815 321	115 581 778	105 707 935	867,971	
Capital expenditure	996 297	4 650 422	1 314 742	22 397 240	-	29 358 700
Non-cash items excluding depreciation						
Accrued expenses	3 146 568	1 946 198	2 313 663	1 607 508	-	9 013 936
Deferred revenue	10 952 549	13 169 101	-	231 368	-	24 353 017

2021	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
Revenue						
Revenue from Non - Exchange Transactions						
Transfers and Subsidies Received	66 523 384	64,429 083	16 134 677	53 684 524	-	200 771 668
Revenue from Exchange Transactions						
Interest Income	2 911 075	132 346	1 052 536	325 087		4 421 044
Rendering of Services	-	4 607 740	62 189 49	8 844 150	867 971	75 641 739
Other Income	973 407	500 621	358 582	(130 664)		1 701 946
Net Gains on Foreign Exchange Transactions	-	-	-	-		-
Total Revenue	70 407 867	69 669 790	79 735 644	62 723 097	-	282 536 397

2021	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
Expenditure						
Employee and Employee Related Costs	41 348 937	17 970 547	39 641 008	31 583 500	-	130 543 993
Board Member Remuneration	810 044	-	-	-	-	810 044
Depreciation and Amortisation	1 317 070	3 087 556	14 505 409	5 228 485	-	24 138 519
Repairs and Maintenance	582 533	2 255 925	5 773 416	2 041 880	-	10 653 754
Data Licence fees	-	29 314 713	-	-	-	29 314 713
Student Bursaries and Research Grants Paid	-	2 685 465	-	4 632 817	-	7 318 283
Antenna Infrastructure Services	-	-	4,131,869	-	-	4 131 869
Training Expenses	841 460	485 925	308,460	395 347	-	2 031 192
General Expenses	19 409 803	2 778 074	21 442 886	5 744 389	-	49 375 152
Net Losses on Disposal of Property, Plant and Equipment	(65 485)	27 253	25 630	108 805	-	1 410 961
Impairment of Accounts Receivable	59 588	-	(4 854 342)	-	-	194 024
Total Expenditure	451 956	7 582 013	82 356 553	49 802 199	-	263,102,131
Surplus (Deficit) for the year restated	5 651 960	3 482 320	(2620 909)	12 920 898		19 434 266

2021	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
Assets						
Non-current - Segment assets	325 388 692	22 260 279	100 879 937	31 297 667	-	480 223 045
Current - Segment assets	160 103 601	6 262 473	67 231 578	53 317 944	-	286 915 597
Total Segment assets	485 888 763	28 522 752	168 111 515	84 615 611	-	767 138 642
Liabilities						
Non - current Segment Liabilities	-	-	-	-	-	-
Current Segment Liabilities ¹	(164 302 744)	98 668 566	112 966 967	90 762 551	-	138 095 340
Total Segment Liabilities	(164 302 744)	98 668 566	112 966 967	90 762 551	-	138 095 340
Capital expenditure	2 006 717	5 212 315	2 700 359	5 221 280	-	15 150 672
Non-cash items excluding depreciation						
Accrued expenses	3 327 995	3 640 504	1 999 961	1 419 010	-	10 387 470
Deferred revenue	-	12 593 443	-	484 184	-	13 077 627

2022	Corporate & Space Engineering	Earth Observation	Space Operations	Space Science	Space Engineering	Total
	R	R	R	R	R	R
ASSETS						
Non-current - Segment assets	325 785 163	22 260 279	100 879 937	31 297 667	-	-
Current - Segment assets	160 103 601	6 262 473	67 231 578	53 317 944	-	-
Total Segment assets	485 888 763	28 522 752	168 111 515	84 615 611	-	-
LIABILITIES						
Non - current Segment Liabilities					867 971	
Current Segment Liabilities ¹	(164 302 744)	98 668 566	112 966 967	90 762 551		
Total Segment Liabilities	(164 302 744)	98 668 566	112 966 967	90 762 551	-	-
Capital expenditure	2 006 717	5 212 315	2 700 359	5 221 280	-	-
Non-cash items excluding depreciation						
Accrued expenses	3 327 995	3 640 504	1 999 961	1 419 010	-	-
Deferred revenue	-	12 593 443	-	484 184	-	-
¹ Directorate liabilities exclude intercompany balances which are eliminated on consolidation of the different directorates.						

3.2 MEASUREMENT OF SEGMENT SURPLUS OR DEFICIT, ASSETS AND LIABILITIES

The accounting policies of the segments are the same as those described in the summary of the significant accounting policies.

3.3 INFORMATION ABOUT GEOGRAPHICAL AREAS

The majority of the entity's operations are in the Gauteng province, with one facility located in Hermanus in the Western Cape.

Revenue from Non-exchange Transactions Gauteng Province	2022 R	2021 R
Corporate & Space Engineering	66 339 082	66 523 384
Earth Observation	63 668 587	64 429 083
Space Operations	19 598 656	16 134 677
	149 606 325	147 087 144

Western Cape Province	2022 R	2021 R
Space Science	82 809 799	53 684 524
Total Revenue from Non-exchange Transactions	232 416 125	200 771 668
Revenue from Exchange Transactions Gauteng Province		
Corporate	3 106 938	3 884 482
Earth Observation	4 622 642	5 240 707
Space Operations	66 474 292	63 600 968
	74 203 872	72 726 157
Western Cape Province		
Space Science	8 815 805	9 038 573
Total Revenue from Exchange Transactions	83 019 677	81 764 730
Segment Expenditure Gauteng Province		
Corporate	68 851 034	64 755 907
Earth Observation	66 260 800	66 187 470
Space Operations	91 548 203	82 356 553
	226 660 037	213 299 930

Western Cape Province	2022 R	2021 R
Space Science	64 553 372	49 802 199
Total Revenue from Non-exchange Transactions	291 213 409	263 102 129
Non - Current Segment Assets Gauteng Province		
Corporate	325 388 692	325 785 163
Earth Observation	25 761 467	22 260 279
Space Operations	103 476 018	100 879 937
	454 626 177	448 925 378
Western Cape Province		
Space Science	51 377 063	31 297 667
Total Revenue from Exchange Transactions	506 003 240	480 223 045
Current Segment Assets Gauteng Province		
Corporate	188 926 710	160 103 601
Earth Observation	4 784 994	6 262 473
Space Operations	61 484 329	67 231 578
	255 196 033	233 597 652

4. STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS

4.1 The South African National Space Agency presents its approved budget on a cash basis and the financial statements on an accrual basis.

4.2 The approved budget covers the fiscal period from 1 April 2021 to 31 March 2022. The Statement of Comparison of Budget and Actual Amounts is prepared using actual amounts as reported on the statement of financial performance on a comparable basis to the original and/or revised budget. The original budget is approved together with the annual performance plan prior to the start of the financial year, whilst the revised budget is an adjustment to the budget six months after the financial year.

4.3 The variance between the actual and budgeted values is explained as follows:

4.3.1 The unfavourable variance of R90.8 million relates mostly to the following:

SANSA secured the acquisition of synthetic aperture radar (SAR) data ingestion from the National Oceans and Coastal Information Management System (OCIMS), an oceans and coastal maritime spatial decision support tool. The DSI funds were not received as expected, which delayed implementation of the project.

During the 3rd quarter an amount of R499,500 was received for the training programme of the Municipalities which is expected to commence in the next financial year.

Space weather center received a the last tranches amounting to R30.89 million during the current financial year. The project is at 70% completion with significant progress in all areas.

The upgrading of the AIT facility could not start in this financial year due to the challenge with access to the property and the ability of the property owner to fund the day-to-day operations and security of the property.

4.3.2 The unfavourable R4 million is as a result of more funding being received to fund student studies in various universities and Postgraduate and PhD Level. The spending was lower than expected due to the travel restrictions and the move to virtual platforms for conferences and research engagements.

4.3.3 The unfavourable R4 million is as a due to delays in the contracting of the South African Airforce (SAAF) and Institute of Maritime Technology (IMT) agreements. The Department of Water & Sanitation agreement was invoices in the 3rd quarter for an amount of R4 million for implementation in progress in which deliverable are yet to be meet. The funds were transferred to income received in advance.

4.3.4 There is a favourable variance of R1 million when compared to budget of Private income, the major contributor being the compass calibration services by Space Science, disaster reports by Earth observation and the charges by Space Operations for the electricity usage to

Stratosat and Avanti.

4.3.5 The is a favourable variance of R9.9 million on Foreign income due to the international contract from a new client and the hosting of infrastructure. Contributing to the variance, was an increase in the number of launch support mission supported by Space Operation.

4.3.6 There is a favourable of R4.6 million mainly due to the interest income earned on positive bank balance.

4.3.7 There is a favourable variance of R8 million on employee cost due to unfilled vacant positions and higher staff turnover rates.

4.3.8 Repairs and Maintenance has a variance of R5 million on repairs and maintenance costs mainly from Space Operations. Not sufficient revenue was generated to undertake the planned maintenance fully in the period.

4.3.9 The data licence fees has a variance of R16 million as DSI has not confirmed the funds we were unable to proceed with Procurement.

4.3.10 Student bursaries and Research Grants Paid refers to the Post graduate support by the DSI grants and other grant related expenses funded by the DSI. There is a unfavourable variance of R10.1 million. These expenses are below budget due to the lock down restrictions and delayed project implementation.

4.3.11 Antenna infrastructure services relate to client hosted infrastructure and the facilitation of civil works and the antenna bases for foreign customers .The expenditure is aligned with foreign income and expected to be recognised at the completion stage.

4.3.12 Training Expenses has a un favourable variance of R4 million as a result of slow spending as training courses that were either cancelled and or cheaper than anticipated as training platforms moved to virtual meetings which are less expensive, due to impact of the COVID-19 pandemic.

4.3.13 General Expenses has unfavourable variance of R53 million is as a result of general slow spending due to impact of the lock down on SANSA's procurement plans. During midterm budget adjustment additional R36,5 million from surplus commitment was brought forward. The delays caused by the lock down that occurred in the 2021/22 financial year resulted in a backlog and SANSA was unable to catch up with the backlog.

4.3.14 Plant and Machinery has unfavourable variance of R32 million as a result of construction of an antenna that only resume in the Financial year 2022/23.

4.3.15 Software and intangible assets has unfavourable variance of R4,3 million as a result of the M-file software that was in the process of being procured.

4.3.16 Vehicles has unfavourable variance of R2,1 million as a result of procurement that has started and at year end we were unable to finalise.

4.3.17 Buildings and other fixed structures has unfavourable variance of R14,8 million as a result of wide range of issues including adverse weather and impact of covid-19.

4.3.18 AIT Facility has unfavourable variance of R59,6 million as a result the upgrading that could not start in this financial year due to the challenge with access to the property and the ability of the property owner to fund the day-to-day operations and security of the property.

4.3.19 Computer Equipment has unfavourable variance of R23 million as a result of delays with imports of some of the computer equipment.

4.3.20 Satellite Development has unfavourable variance of R1,1 million as a result of the project being currently on hold. No additional funds were received for the project.

5. CASH AND CASH EQUIVALENTS

CASH AND CASH EQUIVALENTS	2022 R	2021 R
Total Revenue from Non-exchange Transactions	310 591 650	261 845 641
Total Cash and Cash Equivalents	310 591 650	261 845 641
5.1 Analysis of Cash and Cash equivalents balance		
Cash in Bank for operational requirements (1)	196 439 440	160 635 238
Cash in Bank held for Conditional Grants (3)	114 146 197	01 201 547
Cash in bank main account (2)	54 489 093	27 729 208
Cash in bank conditional grants	59 657 104	73 472 338
Total Cash in Bank Accounts	310 585 637	261 836 784

CASH AND CASH EQUIVALENTS	2022 R	2021 R
5.1 Analysis of Cash and Cash equivalents balance		
5.2 Cash on hand	6 013	8 857
Total Cash on Hand	6 013	8 857
Total Cash and Cash equivalents	310 591 650	261 845 641

1. Cash held for operational requirements represents cash to be utilised to settle trade and other payables, provisions and commitments when the obligations are due.
2. Cash held in the SANSA main account, Ring fenced grants are received through the main account, R54 489 million (2021: R 27 729 million) was still not yet transferred to the ring fenced account at year end.
3. Cash in the bank held for committed conditional grants detailed in Note 13.

6. RECEIVABLES FROM EXCHANGE TRANSACTIONS

Receivables from exchange transactions	2022 R	2021 R
Trade receivables	9 353 313	10 308 817
Other receivable	10 788 391	14 354 646
	20 141 704	24 663 464

6.1 Trade receivables

As at 31 March 2022	Gross	Allowance for Impairment	NET
Trade debtors	17 781 380	(8 428 067)	9 353 313
Total Cash on Han Total	17 781 380	(8 428 067)	9 353 313
As at 31 March 2021			
Trade debtors	18 381 874	(8 073 057)	10 308 817
Total	18 381 874	(8 073 057)	10 308 817

6.1.1 Ageing of Trade receivables and Other Receivables	2021 R	2021 R
Current:		
0 – 30 days	7 253 731	8 654 104
Past Due:		
31 – 60 Days	827 268	1 101 487
61 – 90 Days	709 591	156 283
91 – 120 days	8 990 790	8 470 000
Trade receivables and Other Receivables	17 781 380	18 381 874

6.1.2 Reconciliation for the allowance of impairment	2022 R	2021 R
Impairment reconciliation		
Opening balance	(8 073 057)	(5 345 386)
Exchange rate differences	449	(449)
Impairment allowance for the year	(436 272)	(8 072 608)
Impairment losses for the year	80 813	5 345 386
Reversal of impairment allowance	(8 428 067)	(8 073 057)
Closing balance	(8 428 067)	(8 073 057)

In determining the ability to recover debtors, the allowance for impairment of trade receivables has been made for debtors balances outstanding for longer than their normal payment terms. The impairment allowance was increased as a result of the slow paying debtors which are still active. The impairment allowance provision mainly comprises of the balance owed by for Stats SA.

6.1.3 Trade receivables - fully performing

Trade receivables at the end of the year have been assessed for impairment, the outcome of which indicated that they are recoverable. The carrying amounts of fully performing financial assets included in trade and receivables at year-end are:

Trade receivables - past due and not impaired	2021 R	2021 R
Trade customers – current	7 253 731	8 654 104

6.1.4 Trade receivables - past due and not impaired

Trade receivables that are outside their normal payment terms are considered to be a range of 30 to 60 days past due, depending on customers terms. The following represents an analysis of the past due financial assets that are past due but not impaired as these customers are considered to be recoverable :

	2022 R	2021 R
Trade customers – past due	10 527 649	9 701 972
Allowance for Impairment	(8 428 067)	(8 073 057)
Trade customers – past due and not impaired	2 099 582	1 628 915

Past Due:	2022 R	2021 R
31 – 60 Days	827 268	1 101 487
61 – 90 Days	709 591	156 283
91 – 120 Days	8 990 790	8 470 000
Total	10 527 649	9 727 770

Receivables from Local debtors	12 005 037	10 314 916
Receivables from International debtors	5 776 343	8 066 958
Total Trade Debtors	17 781 380	18 381 874

6.2 Other receivables

As at 31 March 2021	Gross	Allowance for Impairment	NET
Prepaid expense ¹	2 765 107	-	2 765 107
Deposit ²	2 713 723	-	2 713 723
Income accrual	5 305 878	-	5 305 878
Other Debtors	3 682	-	3 682
Total	10 788 391	-	10 788 391
Prepaid expense ¹	4 117 040	-	4 117 040
Deposit ²	2 573 421	-	2 573 421
Income accrual	7 598 994	-	7 598 994
Other Debtors	65 192	-	65 192
Total	14 354 646	-	14 354 646

1. Prepaid expenses consist of advance payments on projects with such contractual arrangements.
2. Deposits consist of electricity consumption and office space lease deposits as per the contractual requirements and are recoverable at the end of the contract term.

6.3 Credit quality of trade and other receivables

Trade receivables consist of local customers from the public sector and international customers mainly from the US and Europe that are in the space industry. Trade receivables are non-interest bearing and general collection terms are 30 – 60 day collection terms. The maximum exposure to credit risk at the reporting date is the carrying amount of trade receivables.

Other receivables consist of deposits paid to suppliers. Other receivables are non-interest bearing and their recovery is based on contractual arrangements with specific suppliers, such as delivery of services or the end of a contractual arrangement where an upfront deposit is required. The maximum exposure to credit risk at the reporting date is the carrying amount of other receivables.

Any allowance for impairment on trade and other receivables exists predominantly due to the possibility that these debts will not be recovered. Management assesses these debtors per directorate grouping where the customer shows signs of none recoverability. The debtors are disclosed as an allowance for impairment under trade customers.

6.4 Classification of financial assets

The Financial Assets of the entity are classified as follows:

Financial Assets	Classification	Carrying amount 2022	Carrying amount 2021
Cash and cash equivalents	At amortised cost	310 591 650	261 845 641
Trade receivables			20 546 424
Trade debtors	At amortised cost	9 353 313	10 308 817
Other Receivables	At amortised cost	8 023 283	10 237 607
Other receivables			2 638 612
Deposits	At amortised cost	2 713 723	2 573 421
Other Debtors	At amortised cost	3 682	65 192
7. Inventory			
Fuel	537 166	537 166	406 492
Total Inventory	537 166	537 166	406 492

8. PROPERTY, PLANT AND EQUIPMENT(.cont) – 31 March 2022

Description	Land	Leasehold Improvements	Buildings	Plant and Machinery	Research Equipment	Vehicles	Office Equipment	Furniture and Fittings	Computer Equipment	Exhibits	Laboratory equipment	Total
	R	R	R	R	R	R	R	R	R	R	R	R
Carrying values at 01 April 2021	37 687 011	349 498	11 841 878	373 527 011	6 425 370	3 555 908	1 317 086	2 182 515	26 164 831	581 373	1 275 899	464 908 381
Cost – Completed assets	37 687 011	1 907 856	13 876 324	131 717 511	25 637 514	7 807 563	5 844 112	6 615 798	51 513 364	1 541 069	3 521 018	287 669 739
Cost – Capital under construction	-	236 880	1 928 806	316 287 227	-	-	-	-	10 347 297	-	-	328 800 210
Accumulated depreciation	-	(1 795 238)	(3 963 252)	(74 477 727)	(19 212 144)	(4 251 654)	(4 527 026)	(4 433 283)	(35 695 831)	(959 696)	(2 245 719)	(151 561 569)
Acquisitions	-	-	21 129 309	14 430 669	134 640	297 400	35 663	1 753 534	7 719 182	160 123	1 276 673	46 937 193
Acquisitions at cost	-	-	-	14 487 637	134 640	297 400	35 663	635 518	3 875 562	160 123	1 276 673	20 903 217
Capital under Construction – Additions	-	-	21 129 309	(56 968)	-	-	-	1 118 015	3 843 620	-	-	26 033 976

Description	Land	Leasehold Improvements	Buildings	Plant and Machinery	Research Equipment	Vehicles	Office Equipment	Furniture and Fittings	Computer Equipment	Exhibits	Laboratory equipment	Total
	R	R	R	R	R	R	R	R	R	R	R	R
Depreciation	-	(27 525)	(406 741)	(11 434 132)	(1 789 211)	(263 932)	(308 198)	(566 767)	(4 607 525)	(209 657)	(497 189)	(20 110 876)
Carrying value of Disposals:	-	-	-	(1 096 327)	(1 472)	(54 227)	(55 030)	(41 683)	(192 652)	-	(13 123)	(1 414 514)
Disposals at cost	-	-	-	(6 973 357)	(29 433)	(265 625)	(122 734)	(156 904)	(1 645 061)	-	(89 868)	(9 262 982)
Accumulated Depreciation	-	-	-	5 877 030	27 961	211 396	107 704	115 222	1 452 469	-	56 745	7 848 468
Carrying values at 31 March 2021	37 687 011	321 973	32 564 447	375 427 220	4 769 327	3 535 149	1 029 522	3 327 600	29 083 835	531 840	2 042 261	490 320 183
Cost - Completed assets	37 687 011	1 907 856	13 876 324	139 231 791	25 742 720	7 839 338	5 757 042	7 094 413	53 743 866	1 701 192	4 728 423	299 309 975
Cost - Capital under construction	-	236 880	23 058 115	336 230 259	-	-	-	1 118 015	14 190 917	-	-	354 834 186
Accumulated depreciation	-	(1 822 762)	(4 369 993)	(80 034 829)	(20 973 393)	(4 304 189)	(4 727 520)	(4 884 828)	(38 850 947)	(1 169 353)	(2 686 163)	(163 823 977)

8. PROPERTY, PLANT AND EQUIPMENT(.cont) – 31 March 2022

Description	Land	Leasehold Improvements	Buildings	Plant and Machinery	Research Equipment	Vehicles	Office Equipment	Furniture and Fittings	Computer Equipment	Exhibits	Laboratory equipment	Total
	R	R	R	R	R	R	R	R	R	R	R	R
Carrying values at 01 April 2020	37 687 011	445 431	10 333 560	380 102 170	6 574 587	3 974 437	1 564 302	2 433 694	28 653 590	774 931	1 189 046	473 732 759
Cost - Completed assets	37 687 011	2 001 045	13 876 324	129 405 056	23 890 964	7 807 563	5 792 736	6 444 054	49 846 545	1 541 069	3 149 844	281 442 211
Cost - Capital under construction	-	236 880	-	314 297 035	-	-	-	-	8 597 297	-	-	323 131 212
Accumulated depreciation	-	(1 792 493)	(3 542 764)	(63 599 922)	(17 316 377)	(3 833 125)	(4 228 434)	(4 010 360)	(29 790 252)	(766 137)	(1 940 798)	(130 840 663)
Acquisitions	-	-	1 928 806	4 314 373	1 798 592	-	107 157	254 902	4 912 104	-	381 460	13 697 395
Acquisitions at cost	-	-	-	2 324 181	1 798 592	-	107 157	254 902	3 162 104	-	381 460	8 028 396
Capital under Construction - Additions	-	-	1 928 806	1 990 192	-	-	-	-	1 750 000	-	-	5 668 999

Description	Land	Leasehold Improvements	Buildings	Plant and Machinery	Research Equipment	Vehicles	Office Equipment	Furniture and Fittings	Computer Equipment	Exhibits	Laboratory equipment	Total
	R	R	R	R	R	R	R	R	R	R	R	R
Restated depreciation	-	(27 526)	(420 488)	(10 907 138)	(1 939 936)	(434 294)	(349 780)	(506 746)	(7 239 408)	(193 558)	(291 495)	(22 290 349)
Depreciation	-	(27 526)	(420 488)	(10 907 138)	(1 939 936)	(434 294)	(349 780)	(506 746)	(7 239 408)	(193 558)	(291 495)	(22 290 349)
Restatement	-	-	-	-	-	-	-	-	-	-	-	-
Carrying value of Disposals:	-	(68 407)	-	17 606	(7 874)	(4 235)	(4 812)	665	(161 456)	-	(3 111)	(231 424)
Cost - Completed assets	-	(93 189)	-	(11 727)	(52 043)	-	(55 781)	(83 158)	(1 495 285)	-	(9 685)	(1 800 866)
Accumulated depreciation	-	24 782	-	29 333	44 169	(4 235)	51 169	83 823	1 333 829	-	6 574	1 569 443
Capital under Construction - Additions	-	-	1 928 806	1 990 192	-	-	-	-	1 750 000	-	-	5 668 999
Carrying values at 31 March 2021	37 687 011	349 498	11 841 878	373 527 011	6 425 370	3 555 908	1 317 086	2 182 515	26 164 831	581 373	1 275 899	464 908 381
Cost - Completed assets	37 687 011	1 907 856	13 876 324	131 717 511	25 637 514	7 807 563	5 844 112	6 615 798	51 513 364	1 541 069	3 521 618	287 669 739
Cost - Capital under construction	-	236 880	1 928 806	316 287 227	-	-	-	-	10 347 297	-	-	328 800 210
Accumulated depreciation	-	(1 795 238)	(3 963 252)	(74 477 727)	(19 212 144)	(4 251 654)	(4 527 026)	(4 433 283)	(35 695 831)	(959 696)	(2 245 719)	(151 561 569)

8.1 Repairs and Maintenance

	Buildings	Computer Software	Plant and Machinery	Research equipment	Vehicles	Office equipment	Furniture and fittings	Computer equipment	Laboratory equipment	Exhibits	Total
	R	R	R	R	R	R	R	R	R	R	R
2022 R	3 503 752	3 375 371	1 772 120	209 326	99 880	60 922	180 593	2 352 504	198 792	12 880	11 766 141
	-										
2021 R	2 602 990	2 673 802	4 338 849	430 431	52 424	8 438	161 831	281 469	103 520	-	10 653 754

8. Property, plant and equipment (continued)

8.1 Work in progress	2022 R	2022 R
Work in progress consists of:		
Leasehold Improvements (Earth Observation Offices - Innovation Hub)	236 880	236 880
Furniture and Fittings	1 118 015	-
Computer Equipment (DESA Project)	14 190 917	10 347 297
Buildings (Space Weather Centre - Hermanus)	23 058 115	1 928 806
Plant and Machinery (Satellite Development)	316 230 259	316 287 227
	354 834 186	328 800 210

Impairment assessment on satellite development project

The satellite development project commenced in 2015 to build and launch a nationally developed earth observation satellite to provide satellite imagery to South African state institutions. The project was funded by the Department of Science and Innovation (DSI), through annual ring-fenced transfers. This was the first flagship project for SANSA and prior to its commencement, it required a consolidation of the space engineering industry through a programme to retain satellite-built capabilities in South Africa, at the same time development test equipment and assembly integration and test facilities also needed an upgrade in order to perform quality tests during development stages and pre-qualification for launching. Due to funding constraints, the project was placed on hold for the past three years.

An independent project review was commissioned to assess the status of the project and provide recommendations. The DSI has indicated commitment to secure funding for the satellite project to completion, but with the pandemics' practical and financial impacts on our society getting the project back onto track has not been successful. In addition to the satellite build project, a grant allocation was received during the year to upgrade the Houwteq assembly, integration, and test facilities to enable qualification tests of the instrument to the next phase of the satellite development. Based on the above developments, no impairment provision was raised on the work in progress value of the satellite build.



8.2 Land

	2022 R	2022 R
Recognition of Land as at 31 March	37 687 011	37 687 011

Key Judgements and Assumptionst

During the establishment of SANSA in 2010, the Hartebeeshoek facility was acquired from the CSIR through a business transfer agreement. The transfer included the perpetual right of use of the farm at Hartebeeshoek which is legally registered under the National Government. In applying the recently issued standard iGRAP 18 on Recognition and Derecognition of Land, the standard directs that an entity should assess whether there are indicators of control of land such as legal ownership and/or right to direct access to land and to restrict and deny others of access to land. In applying this principle, SANSA had uninterrupted use of the farm and controls

the economic activity on the land through the Space Operations programme. The facility is also a National Key point and SANSA has the right to grant or deny access to the premises, therefore a conclusion was reached to recognise the value of the land as an asset.

To determine the cost of the land for recognition in Property, Plant and Equipment, a valuation of the land was performed by Marsh Risk Consulting in March 2020 and the aggregated value of R36 300 000 as at 31 March 2020 was obtained. The valuation assessment was discounted to a value for recognition on 1 April 2019.

Details of Property Description and Registered Owner

Property Description	Remaining Extent of the Farm Hartebeesthoek No. 502,
Registration Division	JQ, Province of Gauteng
Title Deed Number	T7347/1948
Registered Owner	National Government of the Republic of South Africa
Extent	434.8105Ha
Property Description	Portion 1 the Farm Hartebeesthoek No. 502, Registration
Registration Division	T29540/1962
Title Deed Number	JQ, Province of Gauteng
Registered Owner	T29540/1962
Extent	485.4252Ha

Property Description	Portion 2 of the Farm Hartebeesthoek No. 502,
Registration Division	JQ, Province of Gauteng
Title Deed Number	T850/1961
Registered Owner	National Government of the Republic of South Africa
Extent	719.4869Ha
Property Description	Portion 3 of the Farm Hartebeesthoek No. 502,
Registration Division	JQ, Province of Gauteng
Title Deed Number	T29441/1962
Registered Owner	National Government of the Republic of South Africa
Extent	1,104.4931Ha

8.3 Insurance Pay-outs received

During the year a total amount of R2 417 221 (2021 :R39 568) was received as insurance pay out for assets that were either damaged or stolen as follows:

	2022 R	2021 R
Computer Equipment	2 152	39 568
Plant and Machinery	2 415 069	-
Total	2 417 221	39 568

8.4 Change in estimate

Property Plant and Equipment

During 2022 we conducted an operation efficiency review of all asset classes which resulted in change in the expected usage in all assets class. Due to budgetary constraints and challenges to replace assets with technical complexities it has not been possible to replace all aging infrastructure. In terms of the

requirements of GRAP 17 the useful lives of all asset items were reviewed by management at year end. The remaining useful live expectations of some asset items differed from previous estimates. This resulted in a revision of some of the previous estimates which was accounted for as a change in accounting estimate. The effect of this revision is a decrease in the depreciation charges for the current period of R5,6million.

During the year the following changes were made to the estimations employed in the accounting for transactions, assets:

	Value derived using the original estimate	Value derived using amended estimate	Value impact of change in estimate
Computer Equipment	7 012 435	3 686 262	3 326 173
Computer Software	881 980	300 076	581 903
Exhibits	191 825	175 164	16 661
Laboratory Equipment	345 749	245 630	100 119
Office Equipment	262 487	217 394	45 092
Building	358 976	375 221	(16 245)
Office Furniture	326 591	323 227	3 364
Lease improvement	-	-	-
Plant and Machinery	4 003 295	2 543 456	1 459 839
Research Equipment	1 875 706	1 779 305	96 401
Vehicles	628 818	549 256	79 562
	15 887 862	10 194 992	5 692 870

9.INTANGIBLE ASSETS

	2022 R	2021 R
At cost less accumulated amortisation and accumulated impairment losses.	15 683 056	15 314 665

The entity does not have internally generated intangible assets.

9.1 Reconciliation of carrying value of intangible assets

31 March 2021	Intellectual Property	Computer Software	Total
Carrying values at 01 April 2021	108 108	15 206 556	15 314 665
Cost - Completed assets	2 822 660	43 738 509	46 561 169
Cost - Work in progress	-	4 640 175	4 640 175
Accumulated impairment	(1 440 000)	-	(1 440 000)
Accumulated amortisation	(1 274 552)	(33 172 128)	(34 446 679)

31 March 2021	Intellectual Property	Computer Software	Total
Acquisitions	-	1 875 752	1 875 752
Cost - Completed assets	-	1 275 752	1 275 752
Cost - Work in progress	-	600 000	600 000
Amortisation	(29 297)	(1 476 391)	(1 505 687)
Disposals	-	(1 673)	(1 673)
Cost - Completed assets	-	(33 704)	(33 704)
Accumulated amortisation	-	32 031	32 031
Carrying values at 31 March 2022	78 812	15 604 245	15 683 056
Cost - Completed assets	2 822 660	44 980 557	47 803 217
Cost - Work in progress	-	5 240 175	5 240 175
Accumulated impairment	(1 440 000)	-	(1 440 000)
Accumulated amortisation	(1 303 848)	(34 616 488)	(35 920 336)

31 March 2021	Intellectual Property	Computer Software	Total
Carrying values at 01 April 2020	139 805	15 608 924	15 748 729
Cost - Completed assets	2 822 660	42 401 791	45 224 451
Cost - Work in progress	-	4 640 175	4 640 175
Accumulated impairment	(1 440 000)	-	(1 440 000)
Accumulated amortisation	(1 242 855)	(33 172 128)	(32 675 897)
Acquisitions	-	1 443 275	1 443 275
Cost - Completed assets	-	1 443 275	1 443 275
Amortisation	(31 697)	(1 818 781)	(1 850 478)
Disposals	-	(26 862)	(26 862)
Cost - Completed assets	-	(106 557)	(106 557)
Accumulated amortisation	-	79 695	79 695
Carrying values at 31 March 2021	108 108	15 206 556	15 314 665
Cost - Completed assets	2 822 660	43 738 509	46 561 169
Cost - Work in progress	-	4 640 175	4 640 175
Accumulated impairment	(1 440 000)	-	(1 440 000)
Accumulated amortisation	(1 274 552)	(33 172 128)	(34 446 679)

9.2 Work in progress - Intangible assets

Work in progress on intangible assets consists of the following asset classes:	2022 R	2021 R
Computer Software - Earth Observation Data Infrastructure	5 240 175	4 640 175

The intangible asset is part of the computer equipment WIP and as a result no expenditure was incurred for the software. This was planned and the asset completion time is 3 years.

No amount for research and development expenses were recognised during the period.
No intangible assets were pledged as security for liabilities.

10. Trade and other payables from exchange transactions

Trade creditors	2 603 603	1 615 666
Other creditors	698 519	870 321
Income received in advance ¹	24 353 017	13 077 627
Accrued expenses	2 073 958	3 394 422
Accrued leave ²	6 968 518	6 634 996
Accrual for 13th cheque savings	290 527	358 052
Total Creditors	36 988 142	25 951 083

(1) Income received in advance consists of prepayments from customers of R24m (2021:R13m).

(2) Leave accrues to employees on a monthly basis, subject to certain conditions. The accrual is an estimate of the amount due at the reporting date. Employees may not accumulated more than 25 leave days.

10.1 Credit terms of trade and other payables

The average credit period on trade creditors is 30 days from the receipt of the invoice. No interest is charged for the first 30 days from the date of receipt of the invoice. Thereafter interest is charged in accordance with the credit policies of the various individual creditors that the entity deals with. The entity has financial risk policies in place to ensure that all payables are paid within:

10.2 Classification of financial liabilities

The Financial Liabilities of the entity is classified as follows:

Financial Liabilities	Classification	2022 R	2021 R
Trade and other payables			
Trade creditors	At amortised cost	2 603 603	1 615 666
Other creditors	At amortised cost	698 519	870 321
Accrued expenses	At amortised cost	9 333 003	10 387 470

11. PROVISIONS

Work in progress on intangible assets consists of the following asset classes:	2022 R	2021 R
Performance bonus provision	22 599 691	22 599 691
Total Provisions	22 599 691	22 599 691

11.1 Reconciliation of movement in provisions

	2022 R	2021 R
Balance at beginning of year	10 774 988	8 543 939
Reversal of prior year contribution not yet paid out	0	(5 316 031)
Contributions to provision ²	11 824 703	8 508 274
Performance bonus not paid out 2019/20 ¹	-	2 253 464
Performance bonus pay out for 2019/20	-	(3 214 658)
Balance at end of year	22 599 691	10 774 988

The bonus provision represents the estimated liability in respect of performance bonuses payable to employees. Performance bonuses are not guaranteed and are based on the assessed performance of the entity as well as employees performance for the financial year ending 31 March 20

(1) The Board approved the payment of FY2019/20 incentive bonuses for 64% of the bonus pool to qualifying staff members. The payment to the management cohort is under dispute and is therefore included in the bonus provision.

(2) The Board did not approve the payment of FY2020/2021 incentive bonus. This is under dispute and the amount of R8,508,274 from prior year, is therefore included in the bonus provision.

12. COMMITTED CONDITIONAL GRANTS LIABILITY

	2022 R	2021 R
Transfer payment from executive authority	107 568 739	99 893 042
Transfer payment from other departments/entities	6 578 438	1 308 503
Total Committed Conditional Grants Liability	114 147 177	101 201 545

Committed conditional grant liability is made up of amounts not yet spent on ring fenced transfers for projects as follows :

	2022 R	2021 R
Satellite development programme (Note 13.1.1)	1 139 442	1 114 275
Assembly, integration and test facilities upgrade (Note 13.1.3)	58 502 246	36 627 448
Earth Observation Data Center-EO Ring fence grant (Note 13.1.4)	-	-
Earth Observation Data Center (Note 13.1.5)	8 330 027	8 696 210
South African Earth Observation System of Systems (SAEOSS) Portal (Note 13.1.6)	1 190 326	1 690 078
Post graduate student bursary support programme (Note 13.2)	4 959 283	4 330 629
Research and human capital development grants (Note 13.3)	6 077 204	1 308 503
South African Earth Observation Strategy Implementation (Note 13.4)	-	1 512 350
Earth Observation Research and Innovation Fund (RDI) (Note 13.5)	1 343 125	14 267 635
Earth Observation Public Awareness (Note 13.6)	604 805	287 241
Implementation of the Intra Africa Space Science Technology and Innovation Programme (IASSTI) (Note 13.7)	1 052 750	1 118 767
Space Weather Operational Centre (Note 13.8)	30 446 740	30 248 409
Municipal Training (Note 13.9)	501 228	-
	114 147 177	101 201 545

13. TRANSFERS AND GRANTS

	2022 R	2021 R
Operational Transfers	181 283 000	149 242 000
Baseline allocation	181 283 000	149 242 000
Conditional Transfers	68 472 894	51 529 668
Conditions met - transferred to revenue (Notes 13.1; 13.2; 13.3; 13.4-13.5;13.6;13.7;13.8)	68 472 894	51 529 668
Total Transfers and Grants	249 755 894	200 771 668

13.1 Reconciliation of movement in ring fenced grants - Satellite Programme

	2022 R	2021 R
Balance unspent at beginning of year	48 128 013	48 128 013
Current year receipts	24 134 865	24 134 865
Conditions met - transferred to revenue	(2 632 165)	(2 632 165)
Interest Capitalised	1 266 271	1 266 271
	69 162 042	69 162 042

The satellite programme funding agreement includes five projects funded by the Department of Science and Innovation (DSI). The various funds received over the years were consolidated onto the satellite funding agreement in 2016/17 which contains the specific deliverable for projects outlined below:

13.1.1 Satellite development programme - EOSAT 1

Balance unspent at beginning of year	1 114 277	1 087 931
Interest Capitalised	25 165	26 346
Conditions still to be met - remain in liabilities	1 139 442	1 114 277

The satellite development project is a multi-year project funded through transfers from the DSI. Denel Dynamics was appointed as the main contractor for the development of the satellite. The project was placed on hold in the 2018/19 financial year pending the sourcing of additional funding to complete the project.

13.1.2 Operation Phakisa - Earth Observation SAR data acquisition

Balance unspent at beginning of year	-	-
Current year receipts	1 703 000	24 954 000
Conditions met - transferred to Revenue	-	(25 040 945)
Management fee - transferred to revenue	(1 734 942)	-
Interest Capitalised	31 942	86 945
Conditions still to be met - remain in liabilities	-	-

13.1.3 Assembly, integration and test facilities

Balance unspent at beginning of year	36 627 448	37 704 676
Current year receipts	20 910 000	-
Conditions met - transferred to revenue	-	(1 990 193)
Interest Capitalised	964 798	912 964
Conditions still to be met - remain in liabilities	58 502 246	36 627 448

13.1.4 Earth Observation Data Center-(EO Ring fence grant)

Balance unspent at beginning of year	-	12 581 741
Reallocation to Earth Observation Data Centre	-	(10 931 740)
Reallocation to SAEOSS Portal	-	(1 650 000)
Conditions still to be met - remain in liabilities	-	-

This grant is for the upgrade of the Earth Observation Data Center (EODC) to support the Earth Observation sensors and to acquire high resolution satellite imagery aimed at meeting current user requirements.

13.1.5 Earth Observation Data Center

Balance unspent at beginning of year	8 696 210	-
Transfer from Earth Observation Data Centre	-	10 931 741
Current year receipts	1 500 000	-
Conditions met - transferred to revenue	(2 073 823)	(2 475 384)
Interest Capitalised	207 640	239 852
Conditions still to be met - remain in liabilities	8 330 027	8 696 210

13.1.6 South African Earth Observation System of Systems (SAEOSS) Portal

Balance unspent at beginning of year	22 599 691	-
Transfer from Earth Observation Data Centre	22 599 691	1 650 000
Transfer from AFRIGEOSS	21 865	
Conditions met - transferred to revenue	(558 342)	-
Interest Capitalised	36 725	40 079
Conditions still to be met - remain in liabilities	1 190 326	1 690 079

13.2 Post graduate student bursary support programme

Balance unspent at beginning of year	4 330 630	2 562 961
Current year receipts	6 500 000	5 400 000
Current year refunds	2 000	130 000
Interest Capitalised	75 520	13 808
Conditions met - transferred to revenue	(5 823 867)	(3 776 140)
Management fee - transferred to revenue	1 190 326	
Conditions still to be met - remain in liabilities	4 959 283	4 330 630

13.3 Research grants

Balance unspent at beginning of year	1 308 506	858 267
Current year receipts	8 769 504	7 385 497
Refunds to Funders	(175 000)	(231 247)
Conditions met - transferred to revenue	(3 825 806)	(6 704 012)
Conditions still to be met - remain in liabilities	6 077 204	1 308 506
Conditions still to be met - remain in liabilities	-	

These grants are for multiple purposes which include research infrastructure grants as well as student bursaries linked to research projects. The research project grants include running expenses and travel funds as well. The grants were received from the National Research Foundation (NRF), SAASTA, the European Commission and Rhodes University by particular researchers after successful application to a competitive programme. Some of the grants were purely mobility grants. Most of the grants are multiple year awards and are on-going until the project is completed.

13.4 South African Earth Observation Strategy Implementation

Balance unspent at beginning of year	1 512 350	11 978
Current year receipts		1 500 000
Interest Capitalised	9 014	372
Conditions met - transferred to revenue	(1 372 000)	-
Transfer funds to SAEOS	(21 865)	-
Management fee - transferred to revenue	(127 500)	-
Conditions still to be met - remain in liabilities	-	1 512 350

13.5 Earth Observation Research Development and Innovation Fund (RDI)

Balance unspent at beginning of year	14 267 636	16 300 000
Current year receipts	8 000 000	-
Interest Capitalised	271 045	370 906
Conditions met - transferred to revenue	(21 195 556)	-
Management fee - transferred to revenue	-	(2 403 270)
Conditions still to be met - remain in liabilities	1 343 125	14 267 636

13.6 Earth Observation Public Awareness

Balance unspent at beginning of year	287 241	280 450
Current year receipts	500 000	-
Interest Capitalised	11 588	6 791
Conditions met - transferred to revenue	(194 024)	-
Conditions still to be met - remain in liabilities	604 805	287 241

13.7 Implementation of the Intra Africa Space Science Technology and Innovation Programme (IASSTI)

Balance unspent at beginning of year	1 118 767	363 327
Current year receipts	-	1 000 000
Interest Capitalised	25 267	7 634
Conditions met - transferred to revenue	(91 284)	(252 194)
Conditions still to be met - remain in liabilities	1 052 750	1 118 767

13.8 Space Weather Operational Centre

Balance unspent at beginning of year	30 248 407	18 578 923
Current year receipts	30 890 000	20 000 000
Interest Capitalised	659 080	557 015
Conditions met - transferred to revenue	(31 350 748)	(8 887 531)
Conditions still to be met - remain in liabilities	30 446 740	30 248 407

13.9 Municipal Training

Balance unspent at beginning of year	-
Current year receipts	499 500
Interest Capitalised	1 728
Conditions still to be met - remain in liabilities	501 228

14. OPERATING LEASE LIABILITY

The following liabilities have been recognised in respect of non-cancellable operating leases:

	2022 R	2021 R
Balance at beginning of year	167 718	-
Operating lease liability movement	(39 341)	167 718
Total Operating lease liability	128 377	167 718

The prior year end lease with Innovation Hub for the Corporate Offices, Space Engineering and Earth Observations ended on 31st March 2020. A new operating lease with Innovation Hub was signed for a further period of 30 months ending 30 September 2022.

14.1 Amounts payable under Operating Leases

At the reporting date the entity had outstanding commitments under non-cancellable operating leases, which fall due as follows:

	2022 R	2021 R
Up to 1 year	2 704 422	4 432 395
Buildings	2 550 682	4 348 240
Office equipment	153 740	84 155
2 to 5 years	106 363	2 282 826
Buildings	56 500	2 282 826
Office equipment	49 863	-
Total Operating Lease Arrangements	2 810 785	6 715 221

The entity has operating lease agreements for the following classes of assets, which are only significant collectively:

- Buildings - for the rental of office space.
- Office Equipment - for the rental of copier machines

The lease agreement for the building is for a period of 2 years and 6 months with escalation fee of 5% annually, the amounts are paid on a monthly basis.

15. INTEREST INCOME

	2022 R	2021 R
Interest earned on operational funding in bank accounts	4 705 800	4 421 044
Total interest earned from bank accounts	7 023 585	6 683 757
Interest earned on committed grant funding capitalised	(2 317 786)	(2 262 712)
	4 705 800	4 421 044

The interest bearing on the ring-fenced grant was capitalised in the current year as per the instruction from the funder.

16. RENDERING OF SERVICES

	2022 R	2021 R
Services to local public entities	16 710 065	18 005 285
Services to local private entities	6 451 181	5 604 879
Services to foreign clients	51 839 249	52 031 576
	75 000 495	75 641 739

17. OTHER INCOME

	2022 R	2021 R
Sundry Income	150 453	13 761
Rent Received	393 241	289 538
Insurance pay-out	2 417 221	39 568
Expense Recovery	271 654	1 359 079
Total Other Income	3 232 569	1 701 946

18. EMPLOYEE RELATED COSTS

	2022 R	2021 R
Basic Salary	126 044 622	104 332 439
Contractors & Temp	10 303 221	11 255 853
Remote location allowance	4 044 467	3 892 974
Data & Cell Allowance	1 421 303	1 663 866
Performance bonuses current year adjustment	11 956 956	5 478 574
Overtime	1 010 434	960 389
Employee related costs - salaries	(1 683 794)	2 959 896
Total Employee Related Costs	153 097 209	130 543 992

Remuneration of key management personnel of SANSA during the year:

Remuneration of the Chief Executive Officer: Dr V. Munsami (Resigned February 2022)	2022 R	2021 R
Annual Remuneration	2 319 296	2 398 238
Cellphones Allowance	13 530	14 760
Leave Pay	242 685	-
Total	2 575 511	2 412 998
Remuneration of the Chief Financial Officer: Ms. B Pono (Resigned August 2020)		
Annual Remuneration	-	732 265
Performance Bonus	-	-
Cellphones Allowance	-	6 150
Leave Pay Out	-	168 958
Total	-	907 373

Remuneration of the Interim Chief Financial Officer: Mr. D. Bongoza (Appointed October 2020 - December 2021)	2022 R	2021 R
Annual Remuneration	652 023	927 047
Cellphones Allowance	11 070	15 450
Leave Pay	58 297	
Total	721 390	942 497
Remuneration of the Acting Chief Financial Officer: Ms. L. Engelbrecht (Appointed September 2021)		
Acting Allowance	127 244	-
Total	127 244	-
Remuneration of the Executive Director Space Programme: Mr. A. Khatri (Resigned February 2022)		
Annual Remuneration	1 640 556	1 696 334
Cellphones Allowance	13 530	14 760
Leave pay	134 768	-
Total	1 788 853	1 711 094
Remuneration of the Acting Executive Director Space Programme: Mr. H. Burger (Appointed March 2022)		
Acting Allowance	14 690	-
Total	14 690	-

Remuneration of the Managing Director Space Operations: Mr. R. Hodges	2022 R	2021 R
Annual Remuneration	1 689 909	1 602 988
Car and Travel Allowance	74 314	69 325
Cellphones Allowance	14 760	14 760
Total	1 778 983	1 687 073
Remuneration of the Acting Chief Executive Officer : Ms. A. Mila (Appointed March 2022)		
Annual Remuneration	1 619 104	1 534 696
Cellphones Allowance	14 760	14 760
Awards	-	16 000
Acting Allowance	20 240	-
Total	1 654 104	1 565 456
Remuneration of the Managing Director Space Science: Dr. L. McKinnell		
Annual Remuneration	1 613 259	1 529 155
Cellphones Allowance	11 070	14 760
Awards	2 500	6 000
Total	1 626 829	1 549 915

Remuneration of the Executive Director Enterprise Services: Ms. A. Slavin (Resigned May 2021)	2022 R	2021 R
Annual Remuneration	292 060	1752361 1 752 361
Cellphones Allowance	2 460	14 760
Leave pay	168 470	-
	462 991	1 767 121
Remuneration of the Acting Managing Director Earth Observation: Mr. M. Mukwevho (Appointed March 2022)	2022 R	2021 R
Acting Allowance	12 865	-
	12 865	-
Remuneration of the Acting Chief Information Officer: Mr. T Ramosangoana (Appointed March 2022)		
Acting Allowance	14 690	-
	14 690	-

19. BOARD MEMBER REMUNERATION

2022	R	R	R	R	R
	Meeting Fees Claims		Reimbursive Claims		
	Paid Out	Accrued	Paid Out	Accrued	Total
Independent Non-Executive Chairman of the Board					
Ms. X Kakana	126 925		1 482	77 355	-
Independent Non-Executive Members					
Mr. E Jansen (Resigned November 2021)	63 089		-	2 392	65 481
Ms. M Mfeka ²	-	59 658	-	27 909	87 567
Mr. J Prinsloo (Resigned February 2022)	105 764		-	19 508	125 272
Mr. W J van Biljon	84 185		-	32 499	116 684
Ms. I M Pule	120 452	1 377	-	20 106	141 935
Ms. N. Majaja ¹	-		-	25 161	25 161

2022	R	R	R	R	R
	Meeting Fees Claims		Reimbursive Claims		
	Paid Out	Accrued	Paid Out	Accrued	Total
Adv. I Kealotswe-Matlou	80 972		-	27 909	108 881
Ms. L Msibi	80 972	3 672	-	47 175	131 819
Prof. A Muronga	89 234	459	-	32 499	122 192
Ms. M Paul 1	-		-	25 161	25 161
Total Board members Remuneration	751 589	65 166	1 482	337 674	1 155 911

2021	R	R	R	R	R
	Meeting Fees Claims		Reimbursive Claims		
	Paid Out	Accrued	Paid Out	Accrued	Total
Independent Non-Executive Chairman of the Board					
Ms. X Kakana	91 728	13 940	-	-	105 668
Independent Non-Executive Members					
Mr. L S Hamilton (Resigned November 2020)	36 491	-	-	-	36 491
Mr. E Jansen	96 372	8 256	-	-	104 628
Ms. M Mfeka ²	-	47 501	-	-	47 501
Mr. J Prinsloo	88 805	11 010	1 121	-	100 935
Mr. W J van Biljon	72 734	7 338	-	-	80 072
Ms. I M Pule	85 586	7 338	-	-	92 924

2021	R	R	R	R	R
	Meeting Fees Claims		Reimbursive Claims		
	Paid Out	Accrued	Paid Out	Accrued	Total
Adv. I Kealotswe-Matlou	68 838	7 338	-	-	76 176
Ms. L Msibi	77 553	7 338	-	-	84 891
Prof. A Muronga	73 422	7 338	-	-	80 760
Total Board members Remuneration	691 527	117 397	1 121	-	810 044

(1) Appointed as representative of the state

(2) Ms Mfeka has not been remunerated since her reappointment on the SANSA board effective 1 September 2018. Ms Mfeka's previous appointment letter included a clause stipulating that although Ms Mfeka was a full time employee for another state-owned entity, she was entitled to the payment of fees for attendance of meetings and meeting preparation. Ms Mfeka's reappointment letter effective 1 September 2018 is silent on whether meeting attendance and meeting preparation fees are payable. In order for SANSA to process Ms Mfeka's Board fees, the National Treasury requires SANSA to be in possession of confirmation that Ms Mfeka is appointed to the SANSA Board in her personal capacity and does not represent her employer, a state-owned entity. SANSA has not yet received such a document, Ms Mfeka runs the risk of losing a portion of her fees as the fees earned during 2019 will prescribe in accordance to common law principles.

20. DEPRECIATION AND AMORTISATION

	2022 R	2021 R
Depreciation: Property, Plant and Equipment	20 110 876	22 290 442
Amortisation: Intangible Assets	1 505 687	1 848 077
Total Depreciation and Amortisation	21 616 564	24 138 519

21. DATA LICENCE FEES

	2022 R	
Data licence fees	5 681 555	29 314 713
Total Data Licence Fees	5 681 555	29 314 713

Data licence fees are paid for access to various satellites for downloading earth observation satellite imagery.

22. STUDENT BURSARIES AND RESEARCH GRANTS PAID

	2022 R	2021 R
Bursaries to students	6 061 144	4 182 252
Research and development	24 839 933	3 136 030
Total Grants and subsidies paid	30 901 077	7 318 282

23. ANTENNA INFRASTRUCTURE SERVICES

	2022 R	2021 R
Antenna Infrastructure Services	8 322 036	4 131 869
Total Antenna Infrastructure Services	8 322 036	4 131 869

Antenna infrastructure services relate to client hosted infrastructure and the facilitation of civil works and antenna bases for customers. Project costs are recovered from contract revenue.

24. TRAINING EXPENSES

	2022 R	2021 R
Staff Training	1 337 371	1 363 542
Staff Bursaries	382 279	542 801
Board Member Training	628 538	124 850
Total Training Expenses	2 348 188	2 031 192

Staff Training and Bursaries is expenditure incurred on various short courses and funding for various recognised qualification at tertiary institutions

25. GENERAL EXPENSES

	2022 R	2021 R
Electricity	9 812 794	8 621 909
Travel and accommodation	3 769 635	837 727
Other General Expenses	12 241 446	7 063 089
Rent and lease charges	4 703 677	4 638 090
License fees	5 201 290	4 832 177
Data and internet services	5 010 665	4 335 592
Insurance	2 816 693	2 394 344
Advertising & Marketing	1 354 729	1 343 341
External Audit fees	1 556 482	1 205 860
Security	1 901 230	1 712 796

Consulting fees	7 064 621	5 603 988
Telephone Cost	277 564	324 035
Fuel and Oil	1 057 171	1 014 645
Conferences and Seminars	2 303 974	3 805 041
Printing and Stationery	335 807	189 862
Transport Costs	106 688	23 953
Consumables	314 710	196 804
Bank Charges	177 382	163 553
Entertainment	30 840	15 611
Legal Costs	805 898	249 100
Internal Audit fees	665 860	803 632
	61 509 156	49 375 150

26. NET GAINS AND LOSSES ON FOREIGN EXCHANGE TRANSACTIONS

	2022 R	2021 R
EleGains in foreign exchange transactions	747 479	4 426 136
Gains in net Foreign Exchange - realised	747 479	4 426 136
Gains/Loss in net Foreign Exchange - unrealised	-	-
Losses in foreign exchange transactions	(1 346 187)	(5 837 097)
(Losses) in net Foreign Exchange - realised	(1 336 257)	(4 876 498)
(Losses) in net Foreign Exchange - unrealised	(9 930)	(960 598)
Net Gains/Losses on foreign exchange transactions	(598 707)	(1 410 961)

27. NET LOSSES ON DISPOSAL OF PROPERTY, PLANT & EQUIPMENT

	2022 R	2021 R
Disposal of property plant & equipment and intangible assets	4 227	64 263
Net Book value on disposal of property, plant and equipment	(1 414 514)	(231 424)
Net Book value on disposal of intangible assets	(1 673)	(26 862)
Net (Losses) on Disposal of Property, Plant and Equipment & Intangible assets	(1 411 960)	(194 024)

28. NET CASH FLOWS FROM OPERATING ACTIVITIES

	2022 R	2021 R
Surplus for the Year	34 367 067	19 434 270
Adjustment for:	21 616 564	24 138 519
Depreciation and Amortisation	1 411 960	194 024
Non-Cash Losses on Disposal of Property, Plant and Equipment	598 707	1 410 961
Impairment losses for the year	(80 813)	3 179 627
Other non- cash items 1	-	(1 494 597)
Increase in provisions relating to employee costs	11 824 703	3 919 661
Lease smoothing	-	167 718
Operating surplus before working capital changes	69 738 189	50 950 184

Increase in Inventory	(130 674)	(22 823)
Decrease / (Increase) in Receivables from exchange transactions	1 036 317	5 157 920
Decrease/ (Increase) in other receivables	3 566 256	1 077 805
Increase in grant liabilities	12 945 628	10 871 292
Increase in Trade and other payables	10 438 352	5 561 667
(Decrease)/ Increase in Operating Lease Liability	(39 341)	-
Cash flow from operating activities	97 554 726	73 596 044

(1) The balance is mainly made up R1,4m which represents inter-directorate debtors and creditors that did not meet the recognition criteria as liabilities as the amount will not result in the inflow/ outflow of economic benefits from SANSA.

29. IMPAIRMENT AND WRITE OFF OF ACCOUNTS RECEIVABLE

29.1 Receivables from exchange transactions	2022 R	2021 R
Impairment losses for the year (prior year restated)	(80 813)	8 073 057
Impairment losses for the year previously reported	(80 813)	-
Impairment loss	-	8 073 057
(Reversal)/ Recognition of impairment allowance	(80 813)	(4 893 430)
Total Expenditure for Bad Debts	(80 813)	3 179 627

30. IRREGULAR EXPENDITURE

Reconciliation of Irregular Expenditure:	2022 R	2021 R
Opening balance	517 693	92 100
Irregular Expenditure relating to the prior year	-	135 575
Irregular Expenditure relating to the current year	1 703 681	290 018
Less: Condoned or written off by relevant authority	-	-
Total	2 221 373	517 693

Preferential procurement policy	Outcome of investigation		
Sourcing of services without prior approval.	This case was concluded and consequence management is in progress.	-	92 100
Incorrect use of service provider, due to incorrect appointment into the Recruitment Panel.	"The supplier that received an award, was incorrectly awarded due to human error during the evaluation of the tender. SANSA did not suffer financial loss and there was no fruitless and wasteful expenditure noted on this transaction, all services incurred were required by the organisation."	-	135 575
Incorrect use of service provider, due to incorrect appointment into the Recruitment Panel.	"The supplier that received an award, was incorrectly awarded due to human error during the evaluation of the tender. SANSA did not suffer financial loss and there was no fruitless and wasteful expenditure noted on this transaction, all services incurred were required by the organisation."	-	290 018
Declaration of interest (SBD4 form) not completed	The supplier omitted to indicate declaration of interest on the SBD4 form. SANSA did not suffer financial loss and there was no fruitless and wasteful expenditure noted on this transaction as all goods and service were required by the organisation.	1 703 681	-
		1 703 681	517 693

31. COMMITMENTS FOR EXPENDITURE

Capital Commitments	2022 R	2021 R
Approved and Contracted for:-	52 455 075	50 174 917
Property, Plant and Equipment	52 455 075	50 174 917
Intangible assets	-	-
- Approved but Not Yet Contracted for:-	-	575 457
Property, Plant and Equipment	-	575 457
Intangible assets	-	-
Total Capital and Expenditure Commitments	52 455 075	50 750 374
This expenditure will be financed from:	52 455 075	50 750 374
Contract Revenue and Transfers	52 455 075	50 750 374

32. EMPLOYER RETIREMENT BENEFIT INFORMATION

The only obligation of the entity with respect to the retirement benefit plans is to pay over the specified contributions to the pension fund. The total expense recognised in the Statement of Financial Performance represents contributions payable to the plan by the entity at rates specified in the rules of the plan. These contributions have been expensed under employee related costs.

33. RELATED PARTY TRANSACTIONS

South African National Space Agency (SANSA) has been established by the Department of Science and Innovation (DSI) in terms of the South African National Space Agency Act No.36 of 2008. SANSA is listed as a schedule 3A Public entity in terms of the Public Finance Management Act, and is ultimately controlled by the National Executive.

33.1 Related Persons: Executive Authority

The Minister of the Department of Science and Innovation is the Executive Authority of SANSA.

33.2 Related persons: Accounting Authority

The Accounting Authority is constituted by a Board of Directors appointed by the Minister of Science and Innovation.

33.3 Related persons: Key Management

The members of key management personnel of SANSA during the year were:

Chief Executive Officer - Dr V Munsami
(Ex-officio member of the Board) Resigned
February 2022

Acting Chief Executive Officer - Ms. A Mlisa
(Ex-officio member of the Board) Appointed
March 2022 - EO

Managing Director till February 2022

Interim Chief Financial Officer - Mr. D Bongoza (Appointed 1 October 2020 - 31 December 2021)

Acting Chief Financial Officer - Ms. L Engelbrecht (Appointed June 2021)

Executive Director Space Engineering - Mr. A Khatri (Resigned February 2022)

Acting Portfolio Management Executive - Mr. H Burger (Appointed March 2022)

Executive Director Enterprise Services - Ms A Slavin (Resigned May 2021) Acting

Acting Executive Director Enterprise Services - Ms Ntshoko (Appointed December 2021)

Managing Director Space Science - Dr L McKinnell

Managing Director Space Operations - Mr. R Hodges

Acting Managing Director Earth Observation - Mr. M Mukwevho (Appointed March 2022)

Acting Chief Information Officer - Mr. T Ramasangoana (Appointed March 2022)

Acting Chief Information Officer - Mr. T Ramasangoana (Appointed March 2022)

Refer to Note 18 for details on remuneration of Key management.

33.4 Related entities: Entities within National Government

SANSA is a schedule 3A National Public Entity and it is therefore related to all other entities within National Government.

33.5 Related Party Transactions

SANSA receives transfers from the Department of Science and Innovation for its administrative functions. In addition, SANSA received ring fenced transfers from the DSI for various projects. Refer to Notes 13 for details of transfers from the DSI and Note 13 for details of payables and/or commitments from the DSI.

During the year under review SANSA received grants from the National Research Foundation (NRF) to fund different research projects, the details of the grants the liabilities and revenues relating to the grant are disclosed in note 13.3.

Transactions with related parties within national government were in terms of normal supplier and/or client/recipient relationships on terms and conditions no more or less favourable than those which it is reasonable to expect the entity to have adopted if dealing with that individual entity or person in the same circumstances; and terms and conditions within the normal operating parameters established by that reporting entity's legal mandate.

Related party transactions: Revenue and Receivables

Entity Name	Revenue	Receivables	Revenue	Receivables
	R	R	R	R
Department of Science and Innovation	245 930 088	-	194 067 656	-
National Research Foundation	8 769 504	-	7 545 331	-
	254 699 592	-	201 612 987	-
Related party relationships: Purchases and Payables	Revenue	Receivables	Revenue	Payables
Department of Science and Innovation	-	108 069 973	-	99 893 042
National Research Foundation	-	6 077 204	-	1 252 574
	-	114 147 176	-	101 145 616

34. PENDING LAND CLAIM

The land claim remains pending since approximately 2008 in respect of the property upon which SANSA Space Operations is located. South African National Space Agency (SANSA) is not the owner of the land, however the Department of Science and Innovation has supported the application made by SANSA to the Department of Public Works to formalise the land use rights toward the property. In respect of the land claim proceedings, SANSA has also facilitated the filing of the notice to intervene as an interested party in November 2014 with the Randburg Land Claims Court. A scientific expert report was submitted in support of the notice to intervene and also used in support of the submission to Department of Public Works as part of the application for formalised land use rights. The case is still pending.

35. IN-KIND DONATIONS AND ASSISTANCE

No material donations were received during the year under review.

36. EVENTS AFTER THE REPORTING DATE

There were no subsequent events that occurred after reporting date.

37. GOING CONCERN

The annual financial statements have been prepared on the basis of accounting policies applicable to a going concern. This basis presumes that funds will be available to finance future operations and that the realisation of assets and settlement of liabilities, contingent obligations and commitments will occur in the ordinary course of business. SANSA has received its allocated transfers for the first and second quarter of the 2022/23 financial year and is able to meet its operational requirements and financial obligations as they fall due.

38. FINANCIAL RISK MANAGEMENT OBJECTIVES AND POLICIES

All financial instruments arise directly from operations.

The entity does not enter into any derivative transactions. The main risk arising from the entity's financial instruments are cash flow interest rate risk, liquidity risk and credit risk.

The entity reviews and implements policies managing each of these risks. There are no significant concentrations of risk. Compliance with policies and procedures is audited by internal and external auditors on a continuous basis

38.1 The carrying amounts of financial liabilities at reporting date.

	2022 R	2021 R
Trade and other payables	12 635 126	12 873 460
	12 635 126	12 873 460

These exclude income received in advance

38.2 Interest Rate Risk

No material risk exists due to there being no material finance costs in the current finance year. The only real risk that exists is the risk of variations in cash flow due to changes in the interest rate, which will affect interest income.

The entity's income and operating cash flows are substantially independent of changes in the market interest rates.

31 March 2022	Floating Interest Rate	Non-interest Bearing	Total
	R	R	R
Assets			
Receivables from Exchange Transactions	-	20 141 704	20 141 704
Cash and cash equivalents	310 585 637	6 013	310 591 650
Liabilities			
Trade and other payables	-	(36 988 142)	(36 988 142)
Net Financial assets/(Liabilities)	310 585 637	(16 840 425)	293 745 212
31 March 2021	Floating Interest Rate	Non-interest Bearing	Total
Assets			
Receivables from Exchange Transactions	-	24 663 464	24 663 464
Cash and cash equivalents	261 836 784	8 857	261 845 641
Liabilities			
Trade and other payables	-	(25 951 086)	(25 951 086)
Net Financial assets/(Liabilities)	261 836 784	(1 278 765)	260 558 019

The sensitivity analysis below was determined based on the exposure to interest rates at the reporting date. For variable rate long-term instruments, the analysis is prepared assuming the amount of the instrument outstanding at the reporting date was outstanding for the whole year. A 100 basis point increase or decrease was used, which represents management's assessment of the reasonably possible change in interest rates.

Effect of a change in interest rate on interest bearing financial assets and liabilities

Financial Assets	Classification	2022 R	2021 R
External investments:			
Bank balances	Financial assets at amortised cost	310 585 637	261 836 784
Cash Floats	Financial assets at amortised cost	6 013	8 857
		310 591 650	261 845 641
Interest received	-	4 705 800	4 421 044
Interest rate	-	1.52%	1.69%

Effect of a change in interest rate on interest earned from external investments:		2022 R	2021 R
Effect of change in interest rate	%	1.00%	1,00%
Effect of change in interest rate	Rand value	3 105 917	2 618 456
Effect of change in interest rate	%	-1.00%	-1,00%
Effect of change in interest rate	Rand value	(3 105 917)	(2 618 456)

38.3 Liquidity risk

The entity prevents liquidity risk by maintaining adequate banking facilities and by receiving contributions annually in the form of transfers and subsidies.

The following are the contractual maturities of financial liabilities, including interest payments and excluding the impact of netting agreements for the entity:

	Carrying amount	Contractual cash flows: 1 month or less
	R	
2022 Trade and other payables	12 635 126	11 047 058
	12 635 126	11 047 058
2021 Trade and other payables	12 873 460	13 416 325
	12 873 460	13 416 325

38.4 Market risk

There is a foreign exchange risk due to the existence of international debtors. These debtors however have strict 30 day payment terms which ensures that the movement in exchange rates are limited to a shorter time period.

The entity's exposure to foreign currency risk was as follows:

31 March 2022	ZAR	GBP	EURO	USD
Receivables from Exchange Transactions	12 005 037	-	2 012 131	3 937 330
Trade payables	(12 632 888)	-	-	-
Gross exposure	(627 851)	-	2 012 131	3 937 330
31 March 2021	ZAR	GBP	EURO	EURO
Receivables from Exchange Transactions	2 922 028	-	19 617	990 795
Trade payables	2 238	(112)	-	-
Gross exposure	2 924 266	(112)	19 617	990 795

The following significant exchange rates applied during the year:

	2022 R	2021 R
Year-end spot rate		
Euro	16.14	17.40
GBP	-	20.17
USD	18.99	14.73

	2022 R	2021 R
Euro	3 247 579	34 134
GBP	-	(226)
USD	7 476 989	1 459 440
Total	10 724 568	1 493 348

Sensitivity analysis

A 10% strengthening of the rand against the following currencies at 31 March 2022 would have decreased profit or loss by the amounts shown above. This analysis assumes that all other variables remain constant.

38.5 Credit risk

The entity does not have any significant credit risk exposure to any single counterparty.

The amounts below best represents the entity's maximum exposure to credit risk.

Financial Assets	2022 R	2021 R
Bank balances	310 591 650	261 845 641
Receivables from Exchange Transactions	17 376 596	20 546 424
	327 968 247	282 392 065

PART F:

KNOWLEDGE DISSEMINATION

Highlights

SANSA is reporting another exceptional year on its scientific outputs for the 2021/22 financial year. SANSA researchers have produced a total of 37 peer reviewed publications in high impact journals covering the broad fields of space science and earth observation. The top 10, identified through by journal impact factor and author position, are given in table 32. Key highlights from the publications are also provided. SANSA is proud of the international recognition that its researchers are receiving.

In addition to the peer reviewed publications SANSA also reported contributions to four proceedings, and Dr Stewart Bernard edited a 165-page monograph for the International Ocean Colour Coordinating Group (IOOCG). This report has been published as report number 20 of the IOOCG, and highlights of this major work to the Oceans Best Practices Community is recorded in table 32. This demonstrates the significant contribution that SANSA research is making to the international community.

During the year 2021/22, five SANSA researchers received ratings from the National Research Foundation (NRF). Dr John Bosco Habarulema moved from a Y rating to a B2 rating in only six years indicating sustainable considerable international recognition for the high quality and impact of recent research outputs. Drs Zama Katamzi-Joseph and Stefan Lotz each received a first rating of C2 indicating status as established researchers with a sustained record of productivity. Drs Pierre Cilliers and Shimul Maharaj retained their C2 ratings for a further six years.

SANSA exceeded its target in 2021/22 for research productivity with an overall productivity score of 1805. This score is made up of research publications scored according to authorship and impact factor, graduated students, conference proceedings and technical reports, successful rating applications, and research funding received.

	Title	Journal	Impact Factor	SANSA Authors	Highlights
1	Characteristics of solar-irradiance spectra from measurements, modeling, and theoretical approach.	Light: Science & Applications	17.782	Snow, M.	This article reviews solar spectral irradiance measurements over the last few decades, comparing them to several models of solar activity. Solar variation in the ultraviolet part of the spectrum controls the chemistry and dynamics of the upper atmosphere of the Earth and other planets. Measurements from Dr Snow's SOLSTICE instrument were the baseline to which the other datasets were compared.
2	Spectral Properties of the N Component of the Heliospheric Magnetic Field from IMP and ACE Observations for 1973–2020	The Astrophysical Journal	5.874	Nel A.E.	This paper reports on the underlying solar turbulence spectra using a novel technique. This technique yields accurate information for 1) lossy data, and for 2) the energy and inertial range of the turbulence spectrum. This is important because ab initio modulation models require as input turbulence data over the whole of the heliosphere.
3	Assessing the Responses of Aviation-Related SO ₂ and NO ₂ Emissions to COVID-19 Lockdown Regulations in South Africa	Remote Sensing	4.848	Shikwambana L, Kganyago M.	In this study, we look at the variability of emissions at two major airports in South Africa, namely the OR Tambo international airport (FAOR) and the Cape Town international airport (FACT) before and during the lockdown period. Overall, this study observed that the global lockdown regulations had a positive impact on the air quality, causing a brief decline in emissions from commercial aviation at the South African major airports.

Table 32: Top 10 journal publications ranked by impact factor.

	Title	Journal	Impact Factor	SANSA Authors	Highlights
4	Estimating Crop Biophysical Parameters Using Machine Learning Algorithms and Sentinel-2 Imagery	Remote Sensing	4.848	Kganyago M,	This study compared the predictive performance of machine learning regression algorithms for retrieving essential crop biophysical parameters and identified the most influential bands for estimating such parameters. The findings are significant for future biophysical product development, thus facilitating the rapid extraction of actionable information to support precision agriculture and crop monitoring activities.
5	Development and evaluation of near-real time TEC and ancillary products for SANSA Space Weather	Space Weather	4.456	Matamba T.M.	This paper reports on the methodology used to generate near-real-time Total Electron Content (TEC), temporal and spatial gradients of TEC and ancillary products developed at South African National Space Agency (SANSA) for use in the Space Weather Centre. The contribution is significant for the access of duty forecasters to the near-real time maps of TEC and gradients of the ICAO project. This is important because the paper reviews and standardizes the methodology for obtaining the TEC, TEC spatial and temporal gradients mapping, and introduces parameters such as the TEC map quality and the RMSE for TEC maps that are necessary for confidence in the products for the Space Weather Centre.
6	Application of Classical Kalman filtering technique in assimilation of multiple data types to NeQuick model	Journal of Space Weather and Space Climate.	3.584	Matamba T.M.	This paper reports on how to estimate the ionospheric altitude profiles of electron density by employing Kalman filtering technique to assimilate Total Electron Content (TEC) from satellite and ground-based radio receivers with the NeQuick model. The contribution is the ground-based GPS-derived TEC data, which reduces the error (RMSE) associated with the model estimation by at least 56%. This is important because the assimilation of measured TEC if available would improve the outputs of the NeQuick model.

Table 32: Top 10 journal publications ranked by impact factor.

	Title	Journal	Impact Factor	SANSA Authors	Highlights
7	Qualitative Study on the Observations of Emissions, Transport, and the Influence of Climatic Factors from Sugarcane Burning: A South African Perspective	International Journal of Environmental Research and Public Health	3.390	Shikwambana L.	This study makes use of a long-term dataset (1980–2019) to investigate (1) the atmospheric spatial and vertical distribution of pollutants; (2) the spatial distribution and temporal change of biomass emissions; and (3) the impact/influence of climatic factors on temporal change in atmospheric pollutant loading and biomass emissions over the Mpumalanga and KwaZulu Natal provinces in South Africa, where sugarcane farming is rife. Overall, there was an increasing trend in the emissions of BC, SO ₂ , and carbon dioxide (CO ₂) from 1980 to 2019. Climatic conditions, such as warm temperature, high wind speed, dry conditions in the JJA, and SON season, favour the intensity and spread of the fire, which is controlled.
8	Equatorward medium to large-scale travelling ionospheric disturbances of high latitude origin during quiet conditions	Journal of Geophysical Research: Space Physics	2.811	Thaganyana G.P. Habarulema J.B.	This is the first ever investigation to reveal existence of interhemispheric medium to large scale travelling ionospheric disturbances during geomagnetically quiet conditions. For the investigated cases, while there was presence of atmospheric gravity waves in the troposphere-stratosphere, the observed TIDs were mostly as a result of tertiary gravity waves from orographic forcing as theoretically suggested.
9	A statistical study of poleward traveling ionospheric disturbances over the African and American sectors during geomagnetic storms	Journal of Space Weather and Space Climate	2.811	Habarulema J. B. Thaganyana G.P. Katamzi-Joseph Z.T.	This was a statistical study performed during geomagnetic storms covering period 2010–2018. Results provided a link between atmospheric gravity waves launched around the geomagnetic equator to changes in low latitude electrodynamics on a long-term scale. This is useful in formulating relevant inputs for ionospheric models.

Table 32: Top 10 journal publications ranked by impact factor.

	Title	Journal	Impact Factor	SANSA Authors	Highlights
10	Analysis of Wildfires in the Mid and High Latitudes Using a Multi-Dataset Approach: A Case Study in California and Krasnoyarsk Krai	Atmosphere	2.686	Shikwambana L. Habarulema J.B.	In this study, we analyse whether there are any major variations in the emissions and transport of pollutants between two large wildfire cases in the mid latitude of California and high latitude of Krasnoyarsk Krai. The study is important to understand and characterize the emission regime from biomass burning of different land covers using a multi-dataset approach. The results from this case study suggest that high latitude wildfires emit more pollutants than mid latitude wildfires.

Table 32: Top 10 journal publications ranked by impact factor.

	Report Title	Publisher	SANSA Author	Description
1	Observation of Harmful Algal Blooms with Ocean Colour Radiometry	International Ocean Colour Coordinating Group (IOCCG) Dartmouth, NS, Canada	Bernard, S	This monograph examines best practices for observing a wide variety of harmful algae across marine and freshwater ecosystems, and makes a series of recommendations regarding sensors, algorithms, and realising ecological and operational value. This demonstrates the significant contribution that SANSA expertise is making to the international community through the IOCCG as a multi-agency organisation.

Table 33: SANSA edited monographs for 2021/22

SANSA PUBLICATIONS 2021/2022

1. Abiriga F., Amabayo E.B., Jurua E., and Cilliers P.J., Investigation of the impact of Ionospheric Scintillation on GNSS Performance over East Africa, *Advances in Space Research*, 68(7), pp. 2876 – 2889, <https://doi.org/10.1016/j.asr.2021.05.012>, 2021.
2. Bharuthram R., Rufai O.R., and Maharaj S.K., Theoretical studies of low and high frequency electrostatic solitary waves in the magnetopause associated with asymmetric magnetic reconnection, *Advances in Space Research*, 69(8), <https://doi.org/10.1016/j.asr.2022.01.034>, 2022.
3. Burger R.A., Nel A.E., and Engelbrecht N.E., Spectral Properties of the N Component of the Heliospheric Magnetic Field from IMP and ACE Observations for 1973–2020, *The Astrophysical Journal*, 926:128 (10pp), <https://doi.org/10.3847/1538-4357/ac4741>, 2022.
4. Chen X., Huang W., Ban C., Kosch M. J., Murphy D. J., Hu Z., Liu J., He F., Wang R., Yang H., and Hu H., Dynamic properties of a sporadic sodium layer revealed by observations over Zhongshan, Antarctica: A case study. *Journal of Geophysical Research: Space Physics*, 126, e2021JA029787, <https://doi.org/10.1029/2021JA029787>, 2021.
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