ANNUAL REPORT **2017/18**

science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

sansa
SOUTH AFRICAN NATIONAL
SPACE AGENCY

SOUTH AFRICAN NATIONAL SPACE AGENCY

ANNUAL REPORT
2017/18

CONTENTS

PART A
GENERAL INFORMATION

1. PUBLIC ENTITY'S GENERAL INFORMATION

REGISTERED NAME:	South African National Space Agency (SANSA)
PHYSICAL ADDRESS:	SANSA Corporate Office, Enterprise Building Mark Shuttleworth Street The Innovation Hub Pretoria 0087
POSTAL ADDRESS:	PO Box 484 Silverton 0127
TELEPHONE NUMBER/S:	+27 (0) 12 844 0500
FAX NUMBER:	+27 (0)12 844 0396
EMAIL ADDRESS:	information@sansa.org.za
WEBSITE ADDRESS:	http://www.sansa.org.za
EXTERNAL AUDITORS:	Nexia SAB&T
BANKERS:	ABSA Bank
COMPANY/ BOARD SECRETARY	Ms Lorraine Harrison

2. LIST OF ABBREVIATIONS/ ACRONYMS

AAD	African Aerospace and Defence
ACAMS	Advisory Committee for Aeronautical Meteorological Services
ADS	Airbus Defence and Space
AEB	Brazilian Space Agency
AGU	American Geophysical Union
AIS	Automated Identification System
AIT	Assembly, Integration and Testing
ARC	Agricultural Research Council
ASAL	Algerian Space Agency
ASP	African School of Fundamental Physics and Applications
ATNS	Air Traffic Navigation Services
BCT	Broadcast Communication Tool
CAA	Civil Aviation Authority
CASI	Committee of African Space Institutions
CBERS 4	China, Brazil Earth Resources Satellite
CEOS	Committee on Earth Observation Satellites
CNSA	China National Space Administration
CoC	Centre of Competence
CoE	Centres of Excellence
CoS	Condition of Service
COSPAR	Centre for Space Plasma and Aeronomics Research
CPRR	Competitive Programme for Rated Researchers
CPUT	Cape Peninsula University of Technology
CSA	Canadian Space Agency
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CRESDA	China Centre for Resources Satellite Data Applications
CSD	Central Supplier Database
CSIR	Council for Scientific and Industrial Research
CW4SA	Crop Watch 4 South Africa
DEA	Department of Environmental Affairs
DGI	Directorate Geospatial Intelligence
DIFR	Disabling Injury Frequency Rate
DLR	German Aerospace Centre
DoD	Department of Defence
DRS	Direct Reception System
DST	Department of Science and Technology
DTE	Development Test Equipment
DWS	Department of Water and Sanitation
EO	Earth Observation
EODC	Earth Observation Data Centre
EO-SDLC	Earth Observation-Systems Development Life Cycle
ERP	Enterprise Resource Planning
ESA	European Space Agency
ESR	EISCAT Svalbard Radar
ESWW	European Space Weather Workshop
ESSTI	Ethiopian Space Science Technical Institute
FBM	Fractional Brownian Motion
FDP	Fundisa Disk Programme
FGN	Fractional Gaussian Noise

GA	Geo-Council Australia
GAF	Geometric Alignment Facility
GEO	Group on Earth Observation
GICs	Geomagnetically Induced Currents
GNSS	Global Navigation Satellite System
GPG	Gauteng Provincial Government
GPS	Global Positioning System
HCD	Human Capital Development
HET	Higher Education Institute
HF	High Frequency
ICAO	International Civil Aviation Authority
ICTP	International Centre for Theoretical Physics
IDP	Individual Development Plans
ILS	Integrated Logistics Support
INPE	Instituto Nacional de Pesquisons Espaciais
IPSP	International Partnership in Space Programme
IRGO	Interdisciplinary Research and Global Outlook
ISEB	International Space Education Board
ISES	International Space Environment Service
ISF	International Space Forum
ISRSE	International Symposium on Remote Sensing of Environment
ISRO	Indian Space Research Organisation
ISSI	International Space Science Institute
JICA	Japan International Cooperation Agency
JRC	Joint Research Commission
KIC	Knowledge, Interchange and Collaboration
LCC	Life Cycle Costing
LED	Light Emitting Diodes
MEDO	Meta Economic Development Agency
MDA	Marine Domain Awareness
MDTP	Management Development and Training Programme
MoU	Memorandum of Understanding
MTEF	Medium Term Expenditure Framework
MTSF	Medium Term Strategic Framework
NASA	National Aeronautics and Space Administration
NASRDA	National Space Research and Development Agency
NARSS	National Authority for Remote Sensing and Space Science
NASSP	National Astrophysics and Space Science Programme
NCR	National Centre for Research
NDP	National Development Plan
NDMC	National Disaster Management Centre
NIPMO	National Intellectual Property Management Office
NLC	National Lotteries Commission
NRCan	Natural Resource Canada
NRF	National Research Foundation
NSF	National Science Foundation
NSI	National System of Innovation
NSP	National Space Programme
NSS	National Space Strategy
NUST (PON)	Namibia University of Science and Technology
NVD	National Vegetation Density
NWU	North West University
OCIMS	Oceans and Coasts Management Information System
OECD	Organisation for Economic Cooperation and Development
OSR	Optical Space Research

OTF	Optical Test Frame
PDI	Previously Disadvantaged Individuals
PDP	Professional Development Programme
PDR	Prelineary Design Review
PFISR	Poker Flat Incoherent Scatter Radar
PFMA	Public Finance Management Act
QMS	Quality Management System
R&D	Research and Development
RADI	Institute of Remote Sensing and Digital Earth
RAM	Reliability, Availability and Maintainability
ROSCOSMOS	State Space Corporation - Russia
SAAF	South African Air Force
SAAO	South African Astronomical Observatory
SAARP	South African Association for Retired Persons
SAASTA	South African Agency for Science and Technology Advancement
SAEOS	South African Earth Observation Strategy
SALT	South African Large Telescope
SAMSA	South African Maritime Safety Authority
SANAP	South African National Antarctic Programme
SANDF	South African National Defence Force
SANDIMS	South African National geophysical Data and Instrumentation Management System
SANSA	South African National Space Agency
SAR	Synthetic Aperture Radar
SARS	South African Revenue Service
SAWS	South African Weather Services
SC-ADM	Standing Committee on Antarctic Data Management
SCAR	Scientific Committee on Antarctic Research
SCOSTEP	Scientific Committee on Solar-Terrestrial Physics
SDG	Sustainable Development Goals
SE	Space Engineering
SHEQ	Safety, Health, Environment and Quality
SKA	Square Kilometre Array
SO	Space Operations
SPOT	Satellite Pour l'Observation de la Terre
SS	Space Science
SSAU	State Space Agency of Ukraine
STEM	Science, Technology, Engineering and Mathematics
SWC	Space Weather Comp/Centre
TOSS	Transfer Orbit Support Services
TRS	Technical Requirement Specification
UCT	University of Cape Town
UJ	University of Johannesburg
UKSA	UK Space Agency
UNCOP UOS	United Nations Committee on the Peaceful Uses of Outer Space
UNOOSA	United Nations Office for Outer Space Affairs
USAID	United States
USGS	United States Geological Survey
VM	University of Michigan
UWC	University of the Western Cape
VDES	VHF Data Exchange System
VO	Variation Order
WBS	Work Breakdown Structure
WCED	Western Cape Education Department
YTD	Year to Date

3. MESSAGE FROM THE MINISTER OF SCIENCE AND TECHNOLOGY

Space science and technology has become a platform that provides essential data, information and services that are contributing to address societal challenges and ensuring sustainable socio-economic development. This sector supports instant access to information and applications, such as global positioning services (GPS), instantaneous worldwide communications, and a constant ability to record satellite images of our entire environment. At least 40% of the reporting on the Sustainable Development Goals (SDGs) requires geospatial products and services, and that 70% of the essential climate variables that are used to assess the state of our climate require satellite-based data. In addition, space-based systems account for more than 50% of the safety of life operations and this proportion is growing, as new technologies are being developed.

The South African National Space Agency (SANSA), in collaboration with the broader industry, strives to provide valuable satellite technology, data and applications to government and entities for use in areas such as settlement planning, land use monitoring, natural resource management, and in ensuring the safety of citizens.

The completion of the development of ZACUBE-2, an advanced world-class nanosatellite mission with a primary focus on Maritime Domain Awareness applications for Operation Phakisa (Oceans Economy) is a clear indication of South Africa's advancement in space science and technology. ZACUBE-2 will also carry a novel medium resolution K-Line imager as a secondary payload to detect fires.

While I acknowledge the achievements, I also note challenges relating to the issue of funding for the EO-Sat1 satellite build programme. The project has seen very slow progress which is compounded by poor project management. In the coming financial year, efforts will be directed towards resolving these challenges.

My Department is working closely with SANSA and other government departments to ramp up efforts to meet the growing demand for space application products and services across the space value chain, namely, Earth observation, navigation and positioning, satellite telecommunications, satellite engineering and space science. Additionally, strategic international partnerships have been formalised as we make efforts to extend product and service offerings into the African continent.

As we enter the second phase of the implementation of the National Development Plan, I look forward to SANSA playing a central role in moving South Africa to a knowledge-based economy that is ready to compete successfully in the era of the Fourth Industrial Revolution.

Mrs M T Kubayi-Ngubane
Minister of Science and Technology

4. FOREWORD BY THE CHAIRMAN

This has proved to be a challenging year for South Africa and as an entity of Government, SANSA felt the impact as well. The national landscape saw many significant changes within National Government that has resulted in a new Minister at the Department of Science and Technology, Ms Mamoloko Kubayi-Ngubane.

I look forward to working with Minister Kubayi-Ngubane and wish to thank Minister Pandor who has been instrumental in directing and supporting SANSA since the beginning of my Board membership in 2011 and as part of the inaugural SANSA Board. As this is my last term on the Board I also wish to thank my fellow and past Board members for their input and dedication to the operation of SANSA and wish the incoming Board members the very best in leading this incredible Agency.

I have been privileged to have witnessed many of the first successes of SANSA first hand, such as the launch of the Regional Warning Centre for Space Weather, the acquisition and dissemination of highly impactful satellite data through a multi-user licence to all Government bodies. This data is now integrated into the planning at many national departments and entities and influences policy and decision making as it was meant to do. The support on local and international space missions and satellite launches has increased exponentially as this area of the global space industry has witnessed positive growth with the advent of numerous space players entering the market. It is encouraging to see the impact our outreach activities have had on the youth who see the value and opportunities that the space industry can offer to society.

The single most affected area within SANSA has been the challenges with accessing the funding required to complete the EO-Sat1 development. This is unfortunate as the mission impact of a successful launch of the Earth observation satellite would be significant in igniting the local space engineering industry, developing scarce and necessary skills and jobs, profiling the country as a competent and innovative partner for space missions and contributing to the growth of the economy. SANSA remains optimistic that mission success will be achieved with support from the DST and associated Departments.

I wish to acknowledge the contribution towards knowledge generation, job creation, skills development and national pride made by the Management and staff of the Agency and also pay tribute to their continued dedication in spite of the financial constraints. May the SANSA team continue to display the requisite intellectual curiosity, self-awareness, passion and intensity that is required to fulfil SANSA's mandate.

Finally, I wish the Agency staff and leadership continued perseverance and determination to attain SANSA's ultimate goal of positively affecting the lives of all the citizens of our country and continent. Despite the challenges it is only through continued striving that great things are achieved.

Ms Joy-Marie Lawrence
Chairman of the Board

5. CHIEF EXECUTIVE OFFICER'S OVERVIEW

As the first year of my leadership of SANSA ends, I am left reflecting on the affect this experience has had on me as well as the effect I have had on the Agency. It is well known that our local economy has been under strain and it will take some time to raise the growth levels to where it is needed. As a result the Agency experienced the challenges many businesses experience when funds are inadequate and demands are high.

During the last financial year SANSA undertook a review of its strategic direction to identify the full offering a national space agency should contain and what would be possible considering resource and funding available.

A new Strategic framework was developed to expound the new vision and mission of SANSA.

Budgetary constraints further impacted an Agency already under pressure to deliver on its strategic mandate and saw the realignment of goals during the course of the year. Even though this is not an ideal situation for a Space Agency to be in, the challenges also brought opportunities and has encouraged a shift to become more innovative and explore greater collaboration.

I am grateful to the Department of Science and Technology for their continued support and assistance with attempting to access funding mechanisms to ensure SANSA remains sustainable for the benefit of all citizens. I wish to thank Minister Naledi Pandor for her unwavering passion and dedication to the importance of science and technology for the country and welcome Minister Mamoloko Kubayi-Ngubane as the new head of DST. I look forward to continuing the mutually beneficial relationship we have with the Department under her leadership.

It gives me great pleasure to highlight some of the successes SANSA has achieved this past year. SANSA achieved 85% of the agreed targets for the 2017/18 financial year.

One of the highlights for this year was the impact of student support provided to the more than 75 students by SANSA. There was also a significant increase in the number of learners exposed to space awareness campaigns. SANSA delivered Government policy support tools to advise on new policy directions and global technological trends. Local space industry SMEs received greater support through the Agency Space Engineering programme.

SANSA is proud to announce the successful completion of ZACube-2 by CPUT. This Cubesat Programme is a pre-cursor mission for a constellation of cubesats to be used for the Operation Phakisa Programme.

The EO-Sat1 mission remains a concern to the National Space Programme due to funding constraints. Another significant product that was adversely affected by the limited budget was the annual national Mosiac.

In spite of the limitations, the employees and Management of SANSA pursued excellence in their delivery towards the Agency goals and for this I am thankful.

They continue to make an impact in people's lives through space science and technology, without a lot of hype but with the accountability that they should try harder and give back more.

My gratitude extends to the SANSA Board for their guidance and assistance during the financial year and I wish to thank the Board Members who end their term with SANSA this year for their commitment and dedication during their tenure.

The next financial year will see SANSA continue to strive to position South Africa among the global space players and influence the impact of space science, technology and innovation on lives of citizens across the continent.

Dr Valanathan Munsami

Chief Executive Officer

6. STATEMENT OF RESPONSIBILITY AND CONFIRMATION OF ACCURACY OF THE ANNUAL REPORT

We confirm that, to the best of our knowledge:

All information and amounts disclosed in this Annual Report is consistent with the Annual Financial Statements audited by the Auditor-General.

The Annual Report is complete, accurate and free from any omissions and has been prepared in accordance with the Annual Report Guidelines issued by National Treasury.

The Annual Financial Statements have been prepared in accordance with the South African Standards of Generally Recognised Accounting Practice (GRAP) that apply to a public entity.

The Accounting Authority is responsible for the preparation of the Annual Financial Statements and judgements made in this information. The Accounting Authority is also responsible for establishing and implementing a system of internal control designed to provide reasonable assurance about the integrity and reliability of the performance and human resources information and the Annual Financial Statements.

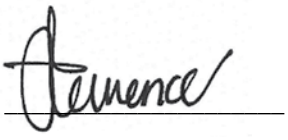
The external auditors are engaged to express an independent opinion about the Annual Financial Statements.

In our opinion, the Annual Report fairly reflects the operations, performance and human resources information and the financial affairs of the public entity for the financial year ended 31 March 2018.

Yours faithfully

Dr Valanathan Munsami

Chief Executive Officer



Ms Joy-Marie Lawrence

Chairman of the Board

7. STRATEGIC OVERVIEW MISSION, VISION AND VALUES

MISSION

TO LEAD AND INSPIRE THE SOUTH AFRICAN SPACE COMMUNITY TO CREATE A BETTER FUTURE

VISION

SOUTH AFRICA TO BE AN INTERNATIONAL HUB FOR SPACE SOLUTIONS FOR THE WORLD OF THE FUTURE

VALUES

SERVICE

TEAMWORK

EXCELLENCE

INTEGRITY

RESPECT

PERSONAL GROWTH

STRATEGIC GOALS

SANSA has seven strategic goals as a means of achieving its mandate. The first five strategic goals are outward looking, focusing on the core programmatic areas of SANSA and have a national emphasis on the South African space landscape. These goals reflect SANSA's strategic intent to lead, coordinate and drive programmes in collaboration with national partners to achieve SANSA's legislated mandate and the attainment of key national priorities in line with the National Space Strategy (NSS) and the National Space Programme (NSP). The two remaining strategic goals are inwardly focused and seek to ensure the sustainable growth of SANSA, whilst striving towards a high-performance Agency.

STRATEGIC GOAL 1: ADDRESS SOUTH AFRICA'S CHALLENGES THROUGH SPACE SERVICES AND PRODUCTS

Space plays a crucial role in providing operational applications or solutions that will address national challenges and provide decision support tools for government. These include applications in natural resource management; climate change and environmental management, disaster management; rural development and urban planning and national safety and security. The primary objective being to ensure that space is integrated into service delivery and is an indispensable tool of government decision and policy formulation.

STRATEGIC GOAL 2: LEAD HIGH-IMPACT COLLABORATIVE R& D ON A NATIONAL SCALE

SANSA firmly believes in the value of science – both fundamental and applied science creates new knowledge that leads to new technologies and innovation which has a direct impact on the economy and society. It also increases the knowledge and understanding of our universe, its sustainability and ourselves. Therefore, SANSA fosters and leads collaborative R&D in space related areas on a national scale. In this regard the prime objective is to increase the national space research output.

STRATEGIC GOAL 3: DEVELOP NATIONAL HUMAN CAPACITY AND ENSURE TRANSFORMATION

For the NSP to be viable and deliver on its targets there is a need to develop interest in STEM (science, technology, engineering, mathematics) alongside the development of rare and transferable skills to meet national demand. Capacity development in space-related areas will not only benefit space, but will have a spill over effect and impact other areas that require scientists, engineers, and technicians. SANSA drives initiatives that develop skills with a transformation objective.

STRATEGIC GOAL 4: ENSURE THE COMPETITIVENESS OF THE SOUTH AFRICAN SPACE INDUSTRY

The global space industry is growing at a rapid rate and is currently estimated at $314 billion USD. It is an industry that drives new technologies and innovation where its applications go beyond space systems into other sectors like medicine, manufacturing, security, and energy, to name a few. One of the objectives of the NSS and SANSA is for South Africa to capture a reasonable share of this global space market.

STRATEGIC GOAL 5: DEVELOP ACTIVE GLOBAL PARTNERSHIPS

Space science and technology, by its nature, can only be effectively undertaken as part of a global partnership. South Africa, through SANSA, positions itself as a strategic partner for the African continent, BRICS countries, other continental and regional blocs, as well as other global players in space science and technology. There is socio-economic value in establishing and maintaining effective and mutually beneficial international partnerships aligned with national strategic priorities that contribute to South Africa's space programme aspirations.

STRATEGIC GOAL 6: ENSURE THE GROWTH AND SUSTAINABILITY OF SANSA

To be able to adapt to the fast changing global space market, and to meet the ever-changing socio-economic needs of the country, it is necessary for SANSA to grow and be sustainable. To be able to execute the Agency's mandate efficiently and effectively, a strong focus on new business development, the effective engagement of key stakeholders, and the effective communication and promotional activities of the NSP, are initiatives to garner favourable publicity of the brand promise, as well as increase the Agency's brand value. SANSA pursues a number of activities that contribute towards the revenue growth of the Agency.

STRATEGIC GOAL 7: TRANSFORM SANSA INTO A HIGH PERFORMANCE AGENCY

SANSA cannot achieve its objectives if it is not efficient and effective and this implies being a high performance organisation that displays transformational leadership, human capital management, excellent business design, operational efficiency and effectiveness, and technological efficiency and effectiveness. A number of initiatives are being driven to position SANSA as a high performance Agency.

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

Programme 1: Administration Programme

Programme 2: Earth Observations Programme

Programme 3: Space Science Programme

Programme 4: Space Operations Programme

Programme 5: Space Engineering Programme

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

STRATEGIC GOALS	PROGRAMMES				
	Administration	Earth Observation	Space Science	Space Operations	Space Engineering
Goal 1: Address South Africa's challenges through space services and products		■	■		
Goal 2: Lead high-impact collaborative R&D on a national scale		■	■		
Goal 3: Develop national human capacity and ensure transformation		■	■	■	■
Goal 4: Enhance the competitiveness of the South African space industry		■		■	■
Goal 5: Develop active global partnerships	■	■	■	■	■
Goal 6: Ensure the growth and sustainability of SANSA	■				
Goal 7: Transform SANSA into a high performance Agency	■				

Table 1: The SANSA divisions and alignment with goals

STRATEGIC PROGRAMMES

PROGRAMME 1: ADMINISTRATION PROGRAMME

The Administration 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 directorates.

PROGRAMME 2: EARTH OBSERVATION (EO) PROGRAMME

SANSA acquires, archives, processes and distributes imagery and products to government entities, R&D institutions and higher institutions of learning. This ensures the supply of cost-effective data and information to government departments in support of various national imperatives. In addition, the availability of processed imagery to stakeholders, such as research councils and academic institutions, enables these organisations to utilise all the multi-government licensed imagery at no additional cost. SANSA also provides Higher Education Institutions (HEIs) with geospatial resources for student training through its Fundisa Disk Programme (FDP) to promote the use of spatial information at tertiary level.

PROGRAMME 3: SPACE SCIENCE (SS) PROGRAMME

The Space Science Programme leads multi-disciplinary space science research and applications. Key functions include fundamental and applied space science research, the support of space facilitated science through data acquisition, the coordination and administration of scientific data, and the provision of space weather and magnetic technology products and services on a commercial and private basis. Through the Space Science Programme, SANSA contributes to the worldwide network of magnetic observatories responsible for monitoring of the Earth's magnetic field, and participates in global scientific projects. The programme also provides leadership in post-graduate student training as well as provision of science advancement & public engagement, and learner and educator support with STEM subjects.

PROGRAMME 4: SPACE OPERATIONS (SO) PROGRAMME

The Space Operations Programme is responsible for the acquisition of satellite data for the EO programme and the provision of ground segment support to the local and international space players. 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 and intends to extend this capability to teleports.

PROGRAMME 5: SPACE ENGINEERING (SE) PROGRAMME

The Space Engineering Programme provides systems engineering and project management expertise and drives the 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 engineering and analysis, leads the technical side of space programme management, provides human capital development in space engineering and facilitates private space industry partnership. The programme further drives efforts to support the National Development Plan and promote manufacturing and technology development in South Africa.

8. LEGISLATIVE AND OTHER MANDATES

The South African National Space Agency (SANSA) was established in terms of the South African National Space Agency Act (Act No. 36 of 2008), as amended. SANSA is a Schedule 3A Public Entity in terms of the Public Finance Management Act (No.1 of 1999 as amended by Act 29 of 1999).

LEGISLATIVE MANDATE

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 Act (Act No. 36 of 2008). The former, an instrument of the dti, caters for the regulatory/policy context for a South African space programme, whereas the latter, an instrument of the DST, enables the establishment of SANSA as an implementing agency for the NSP.

POLICY MANDATE

Aligned to the legislative instruments above, there are two sets of policies that directly impact the national space sector. The first is the National Space Policy, which 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 dti and is aligned to the Space Affairs Act. The second is the DST's Ten Year Innovation Plan, which is a blueprint that seeks to transform the economy to a knowledge based economy and for which space science and technology is identified as one of five grand challenges.

STRATEGY MANDATE

The National Space Strategy (NSS) and the South African Earth Observation Systems (SAEOS) Strategy provide directives that inform the operationalisation of the NSP, inclusive of the role that SANSA should play. The NSS seeks "***for South Africa to be among the leading nations in the innovative utilisation of space science and technology to enhance economic growth and sustainable development and thus improve the quality of life for all***". Given the critical importance of Earth observation applications for informing decision-making and evidence-based policy making in government spheres, the objectives of the SAEOS is to coordinate the collection, assimilation and dissemination of Earth observation data and information.

THE OBJECTIVES OF SANSA, AS PER THE SANSA ACT, ARE TO:

Objectives of SANSA				
Promote the peaceful use of 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 & technological competencies and capabilities through human capital development outreach programmes and infrastructure development	Foster international co-operation in space-related activities

NATIONAL DEVELOPMENT PLAN AND MTSF

Government has adopted the 2014 - 2019 Medium-Term Strategic Framework (MTSF) to be used as the first five-year building block towards realising the Vision 2030 in the National Development Plan (NDP). The MTSF lists 14 key outcomes with associated activities and targets to be achieved by 2019. There are eight outcomes that are impacted by key activities of SANSA and these are presented on the following table:

Outcome 1: Quality Basic Education	• Improve the uptake of STEM subjects • Outreach to rural schools (Engaged 23 246 youths through science awareness / outreach)
Outcome 3: All people in South Africa are and feel safe	• Satellite imagery for defence support • Geospace and geomagnetic information for defence • Space weather services for defence • Electromagnetic services for defence • Navigation services for defence
Outcome 4: Decent employment through inclusive economic growth	• Supported 63 external jobs through the satellite programme • Student training to increase employability
Outcome 5: Skilled & capable workforce to support an inclusive growth path	• Student training • Partnerships with universities and R&D institutions • Provision of student training resources to universities and R&D institutions • Research programmes • Hands-on and internship training
Outcome 7: Vibrant, equitable, sustainable rural communities contributing towards food security	• Cropwatch4SA • Support to DAFF, ARC • Rangelands project • Water projects
Outcome 8: Sustainable human settlement & improved quality of household life	• Human settlement information and services • Geospatial planning • Support for electricity provision • Support for water provision
Outcome 10: Protect & enhance our environmental assets & natural resources	• Environmental management resources • Sustainable development planning • Earth science research
Outcomes 9 and 12: Effective & efficient local government and public service	• Decision support tools • Applications and services that facilitate service delivery • Public sector training

Table 2: NDP impact by SANSA

SANSA'S INTERFACE IN THE NSI LANDSCAPE

STAKEHOLDER RELATIONS

SANSA has a significant footprint within the National System of Innovation (NSI) and has linkages to six key stakeholder groups, namely:

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

9. ORGANISATIONAL STRUCTURE

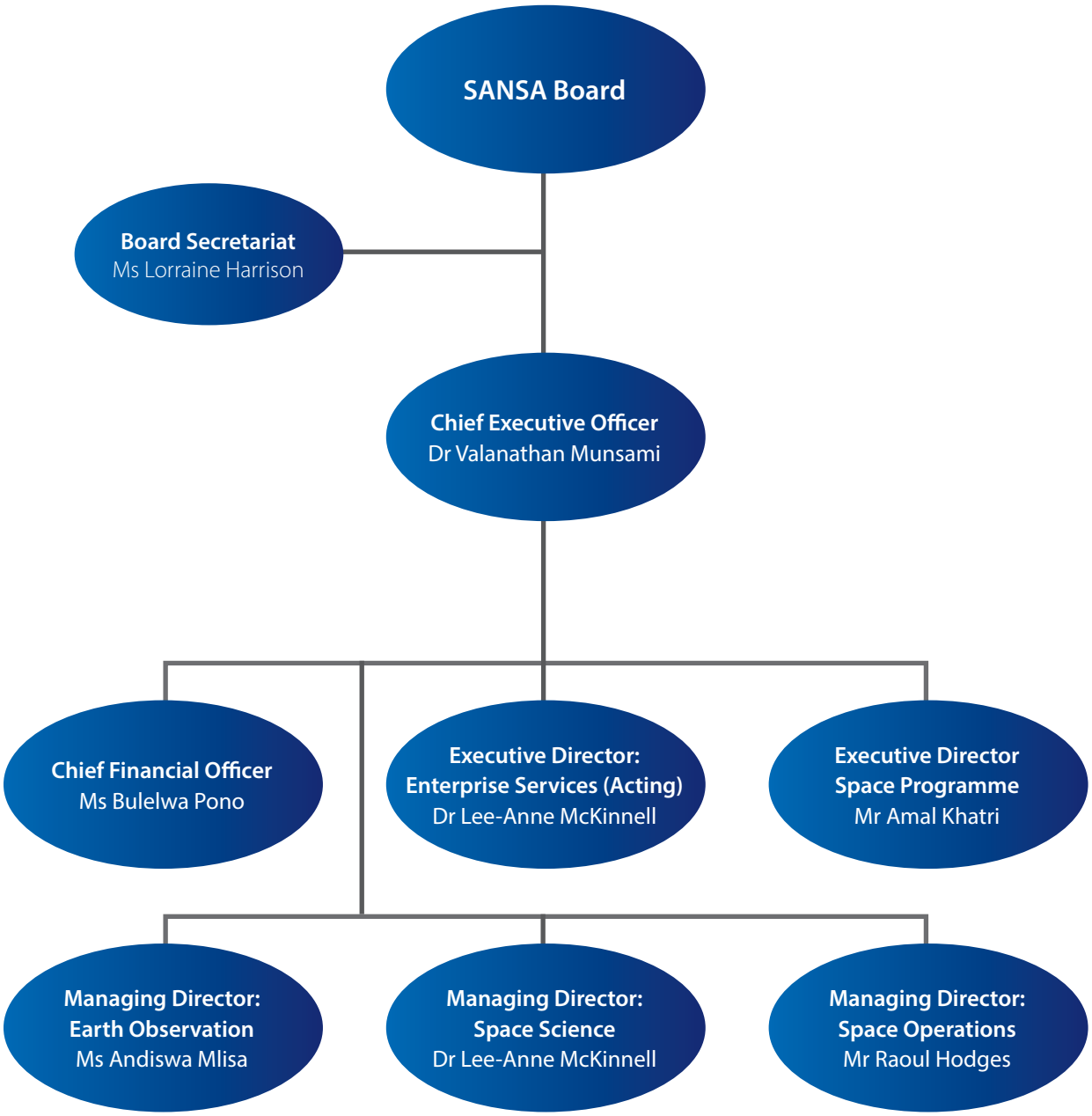


Figure 1: The Executive Management structure of SANSA as at 31 March 2018

PART B
IMPACT REPORT

10. THE IMPACT OF SPACE IN OUR SOCIETY

SERVING SOCIETY

NAVIGATING TO GREATER HEIGHTS OF SAFETY

All aircraft of the South African Air Force (SAAF) are required by law to have a magnetic compass as an important back-up to the integrated navigation system. Magnetic compass swings are conducted periodically for all aircraft, to ensure the calibration of these life-saving navigational tools.

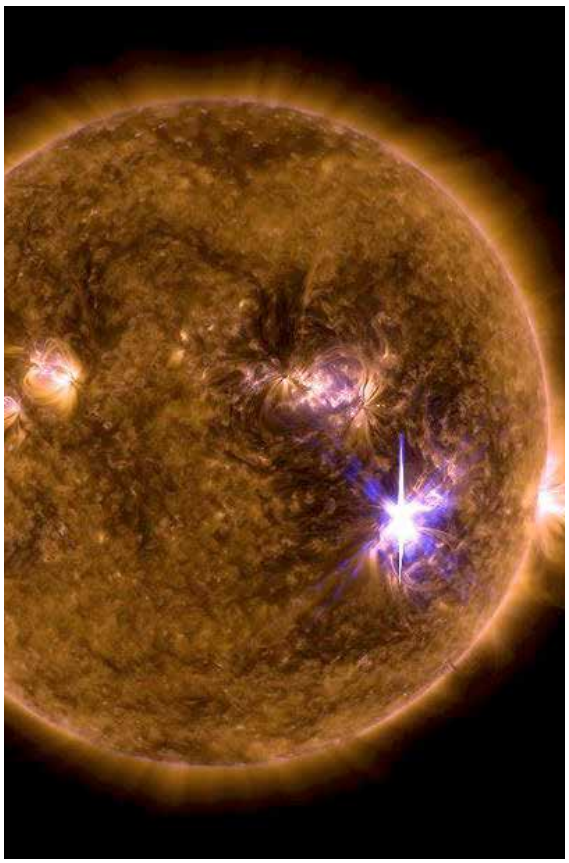
SANSA is the only organisation performing compass swings in South Africa - making this an invaluable service to the nation and ensuring the safety of thousands of planes on an annual basis.

Ten aircraft compass swing courses were conducted over the last year and 47 compasses for private aviation companies and the SAAF were calibrated at the magnetically clean facility in Hermanus. The programme has produced excellent technicians including SANSA's own course instructor, who today trains other technicians after 12 years of experience in the Air Force. The compass swing courses, which are accredited by the Civil Aviation Authority (CAA), forms part of a contract that SANSA has with the SAAF to provide magnetic technology services. The courses contribute significantly to the training of defense personnel in South Africa, and result in the appropriate knowledge and skills being developed for the security of the nation.

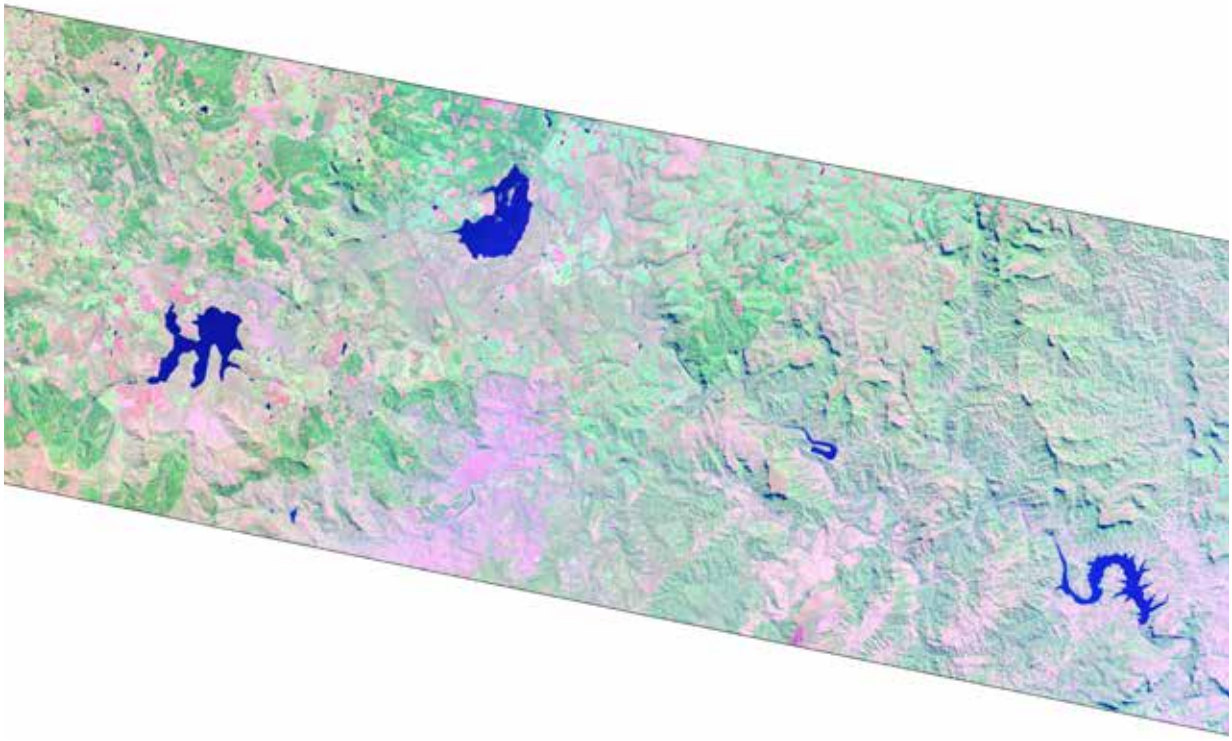
BIGGEST SOLAR FLARE IN A DECADE THREATENS COMMUNICATION

SANSA provides space weather knowledge, expertise, products and services through the SANSA Space Weather Centre, which is the only Regional Warning Centre for Africa under the International Space Environment Service (ISES). The Centre services a unique client set, and provides forecasts and warnings of adverse space weather that can negatively affect modern day technology such as communication and navigation systems, power grids, mobile phones and avionics to name a few.

In September 2017 saw the Centre go to high alert when the strongest solar flare in over a decade was recorded. The resulting intense space weather event caused high frequency (HF) radio blackouts across the daytime side of Earth affecting HF communication over Africa, Europe and the Atlantic Ocean. The solar flare was accompanied by a coronal mass ejection (CME) which travelled towards Earth at a speed of over 1200km per second impacting the Earth's magnetic field. The impact of the CME sparked a strong (G3) geomagnetic storm on Earth that affected HF communication, navigation systems such as GPS, and communication systems such as DStv, mobile phones and internet connectivity. Warnings and updates were issued during the storm to national power facilities, the South African National Defence Force, the aviation sector and other clients as well as creating public awareness through media interviews and press releases.



SDO image shows the X9.3 class solar flare flash on the Sun on Sept. 6, 2017



Status of water along the uMgeni River Catchment, in KwaZulu-Natal that frequently experiences suspended material problems, eutrophication and depreciation

EARTH OBSERVATION SERVICES TO THE NATION

Chapter 14 of the National Water Act outlines the regulations with regards water use in the country including monitoring of water resources and limiting water use. Earth observations complements the current monitoring systems which are faced with challenges such as vandalism, ageing infrastructure and high maintenance costs. The Department of Water and Sanitation (DWS) is benefiting from the national water body dataset developed by SANSA for water licensing and inventory purposes. In addition, the mapping of irrigated and non-irrigated areas provide the Department with a reliable means of verifying water usage in various water catchment areas.

Understanding urban expansion and human settlement growth is critical for improved planning on service delivery and addressing social-economic issues. The high resolution satellite imagery and the human settlement dataset derived by SANSA was used by the Department of Human Settlements, Housing Development Agency, Municipal Demarcation Board, Statistics South Africa, Eskom, National Lotteries Commission and municipalities, such as the City of Ekurhuleni who use the dataset to assess human settlement growth within the municipality and verification on whether the housing development projects were approved or not by the authorities. The human settlement dataset will further support Government in monitoring Sustainable Development Goal (SDG) 11 on Sustainable Cities and Communities.

One of the main tenets of the Government's Nine-Point Plan is stated as "***revitalising the agriculture and agro-processing value-chain by increasing support for existing smallholder farmers and exploring ways to substantially expand the number of agricultural producers***". One of the inhibitors to agricultural growth is access to actionable information. A number of crop monitoring products (such as Crop Arable Land Fraction and Crop Anomalies) and biophysical products (such as Chlorophyll Content and Canopy Water Content) were produced and distributed to stakeholders that included an SMME insurance company (Mobbisurance), an agricultural company (SENWES) and the Grain Farmer Development Association (GFADA) to support crop monitoring activities during the 2016/2017 and 2017/2018 summer growing seasons. GFADA received crop monitoring products on a weekly basis to be used

for precision farming. In addition, to raise awareness on the value of Earth observation for agriculture, SANSA published a policy brief titled *"Earth Observation Technologies in Support of Agriculture and Food Security"*. SANSA works with the National Disaster Management Center (NDMC), an entity of the Department of Local Government and Cooperative Governance, in a campaign aimed to create disaster awareness in five district municipalities in Limpopo, North West, Eastern Cape, Mpumalanga, and Northern Cape.

This awareness will lead to more lives being saved and reduced damage to property in the event of a disaster.

SANSA provides awareness on the use of satellite images and associated flood risk information, where households are at risk of flooding both in rural and urban settlements, during heavy rains. Participants in this campaign include provincial government officials, local councils, ward committees and communities.

The acquisition of high resolution (SPOT 6/7) imagery for South Africa was completed and validated for quality and accuracy. The satellite imagery is now available at no cost to all government departments, research and academic institutions. The imagery supports a number of Government services such as flood risk mapping (City of Ekurhuleni), geospatial reference framework (Stats SA), electricity generation planning (ESKOM), irrigation monitoring (DWS) and many more.

Thirty two fire investigation reports were completed containing information on the extent of the fires as well as the points of origin. This service is significant when evidence is required in court during litigation and also in support of insurance claims that may arise due to the damage caused by fire outbreaks on farmland.

KNOWLEDGE CREATION

SANSA scientists published a number of journal papers in high impact accredited journals covering various thematic areas in Earth observation including food security, invasive vegetation mapping, land cover mapping, human settlements mapping and malaria mapping.

Nine conference papers were presented at the 37th International Symposium on Remote Sensing of Environment (ISRSE) that was hosted by SANSA in May 2017 under the overarching theme *"Earth Observation for Development and Adaptation to a Changing World"* and these covered areas such as satellite sensor design, ground segment development, human settlements mapping in support of sustainable development, food security and monitoring mining impacts.

MAKING SATELLITE IMAGERY EASILY AVAILABLE

The new, internationally accepted, Landsat 8 and Landsat 5 processing software developed by SANSA scientists will significantly cut down on software purchasing and licensing costs. This will help support Near Real Time Landsat applications and fast track delivery of Landsat image products to South African community.

MAPPING OUR CITIES

The remote sensing experts at SANSA developed the first version of human settlement detection system using Sentinel data and tested it over cities in Africa. These mapping algorithms will support development of up to date human settlement data required to support spatial planning, service delivery and monitoring of progress made on the development plans.

THE SPRITE HUNTERS OF THE KAROO DESERT

SANSA researchers braved the cold winds and encroaching darkness of the Karoo desert, working with sophisticated cameras and near-real-time data feeds they hunted thunderstorms in search of illusive sprites. A rare atmospheric phenomenon that has been observed sporadically since the late 1980s. Sprites are gas discharges caused by lightning strikes and South Africa is a good place to study sprites as the country is a global lightning hotspot during the summer months. 2018 marked SANSA's third year of observing sprites - first from Sutherland where the initial images were captured and this year also in Canarvon, in the Northern Cape. The Team hope that observing a sprite from two locations simultaneously will allow them to triangulate the sprite and get the position and height, to determine how it relates to the position of the parent lightning strike. Both the triangulation and the estimation of the electron energy in a sprite would be world firsts. Within three nights during February 2018, the team recorded in excess of 150 sprites - an unusually high number. This is just the beginning for sprite research in South Africa. Future plans include setting up a low-frequency electric field array in the Karoo to record lightning strikes in real-time and with greater accuracy (right now

researchers rely on South African Weather Service data on lightning strikes). This would help establish which type of lightning strikes cause different types of sprites, and shed light on the mechanisms of sprite formation.

NEW THEORETICAL MODEL DESCRIBES UNUSUAL WAVES OBSERVED IN EARTH'S MAGNETOSPHERE

An unusual discovery was made by SANSA researchers in their quest to better understand Earth's magnetosphere. A new model has accurately described a type of wave that occurs in the space around our planet. The magnetosphere is a region surrounding our planet where ionised gas of charged particles known as plasma interacts with the Earth's magnetic field.

A SANSA doctoral student used a mathematical approach called theoretical fluid modelling to describe an electron-acoustic soliton which has been observed by satellites in the magnetosphere. The results from the study show that a beam of electrons in the magnetosphere causes the electron-acoustic soliton to switch polarity from negative to positive. Such theoretical results are important because observation alone is not enough to understand the magnetosphere. Measuring wave properties directly in space is incredibly challenging and technical. SANSA researchers will continue to create theoretical models that can describe observations and can even help us understand what happens in those very hard-to-reach places where there are no satellites.

This research is ultimately linked to our understanding of space weather, which impacts technology in space, as well as humanity's prospects of living in space or on other planets.

The theoretical research also gives students a solid academic foundation in mathematics and physics on which to build their careers.

UNDERSTANDING BLACK AND ANTI-BLACK AURORAS

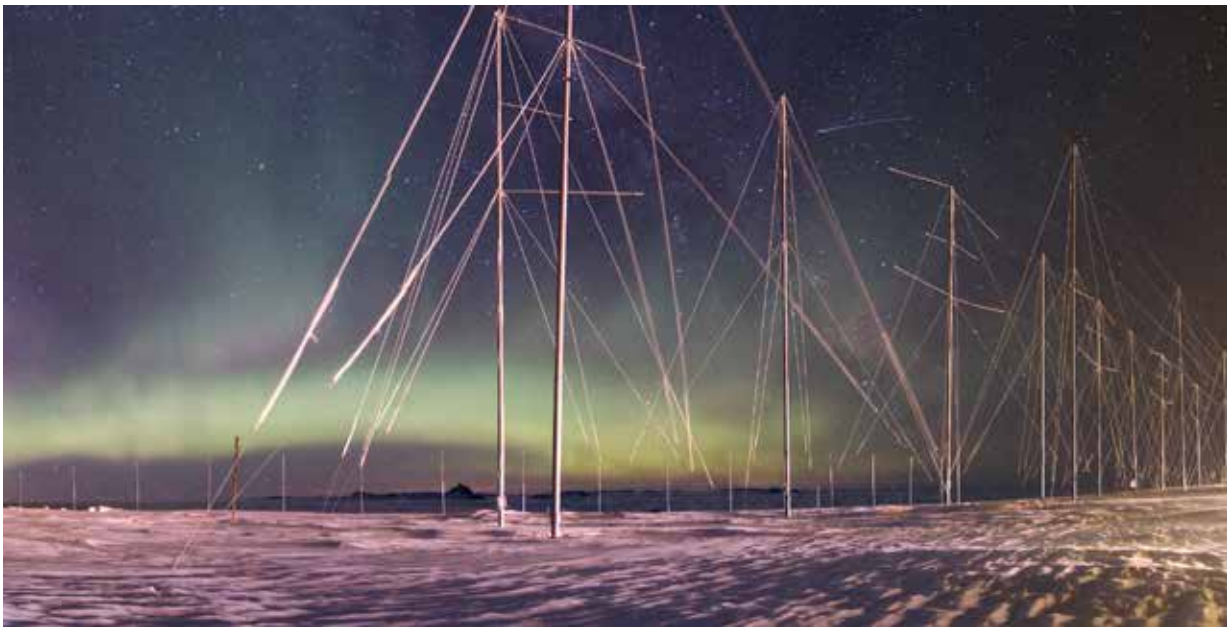
SANSA researchers are determining the characteristic energy of precipitating electrons within black and anti-black auroras. This was done by imaging the anti-black auroras with two cameras using different optical filters and comparing their relative brightness. The images were registered using the background star field, and the absolute image brightness was calibrated using selected stars. The calibration from the photon count into electron energy was done using the EISCAT incoherent scatter radar. Researchers expect to find that the black/anti-black auroras contain electrons of lower/higher energy compared to the background field.

IONOSPHERIC STORM TIME INDEX

SANSA researchers are developing an ionospheric storm time index which is suitable for the South African region. The Space Weather Centre provides operational services such as forecasting and warnings of ionospheric conditions, and disturbances due to space weather events, as well as High Frequency (HF) propagation predictions to clients. The ionospheric storm index will be an important product of the space weather centre as it will provide an immediate and practical form of support to users of radio communications systems affected by ionospheric conditions. This index will be implemented as a short-term forecasting tool providing the ionospheric response during storm conditions which is important for ensuring the reliable performance of advanced technological systems such as communication and navigation systems.

MEASURING THE THERMOSPHERE WILL HELP KEEPS SATELLITES ALIVE

SANSA researchers are developing a new technique to use the SuperDARN HF radar system to measure the neutral density of the thermosphere. This is done by observing the variability of the ion velocity, which then translates into the ion-neutral collision frequency, which relates to neutral density. The new technique is a variation of a similar technique developed successfully by a SANSA researcher for incoherent scatter radars. This is important as it provides a technique for determining the measurement of the changing density of the thermosphere due to geomagnetic storms, which affects satellite drag and therefore the operational lifetime of a satellite which has economic consequences.



The SuperDARN radar network is used to measure various space science phenomena, including measuring the density of the thermosphere

SATELLITE DEVELOPMENT PROGRAMME

South Africa's technology demonstrator satellite, SumbandilaSat was launched in 2009 and provided much knowledge on satellite development and paved the way to understanding the mission for the development of the next Earth observation satellite, EO-Sat1. The limited number of spectral bands on SumbandilaSat will be increased on EO-Sat1 and the ground sampling distance advanced from about 6.25m to 2.5m indicating a big shift in the payload design. SumbandilaSat suffered damage from solar emissions two years into operation and, as a result the on-board computer on EO-Sat1 will be upgraded using radiation tolerant components. The torque/volume ratio of the reaction wheels will be doubled and the angular momentum increased by a factor of five as an added advantage. The data transmission rate will be tripled allowing for more efficient data downloads that influences the effectiveness for users.

The EO-Sat1 satellite bus will also be a foundational bus for a number of future missions as a result of the functionality of the design specifications acquired through research and experience.

SHAPING OUR INDUSTRY

GROWING SA'S SATELLITE INDUSTRY

South Africa aspires to become a leading player in space technology on the continent and although South Africa has invested in space over the past few decades, the country's competiveness remains slow across the space value chain. In order to pollinate the fledgling space industry, SANSA set local industry contractual targets during the development of EO-Sat1. The local industry is being developed through the acquisition of the satellite programme which employs 47 people. The development of the satellite has resulted in unique intellectual property which the country can leverage through commercialisation of these technologies and creation of new market opportunities. The consortium of Cape Peninsula University of Technology (CPUT), Stone Three and Clyde Space is involved in the development of a South African constellation of low cost nano-satellites to facilitate South African Marine Domain Awareness (MDA), as required by Operation Phakisa which is an initiative by the Government to address issues within the NDP, by supporting international maritime communications, ranging from the current Automated Identification Service (AIS) standard to the future VHF Data Exchange System (VDES) standard. The MDA constellation will provide South Africa with security and control of its AIS and VDES maritime data with associated improved control over data cost and access. In addition, with its flexible communications platform, the MDA nanosatellite constellation will also enable various other satellite-based services for South Africa and the greater continent.

The programme has further resulted in development postgraduate students which are critical to support the development of future space systems.

The Satellite programme forms a critical benchmark for shaping the industry and developing core capability within the country. Without long term commitment on a NSP, the country risks losing this core capability and opportunities that exists within the broader space industry. It has become increasingly critical to ensure the sustainability of a local space programme to enable participation in the global space economy.

ACQUISITION OF SATELLITE IMAGERY

EO data is acquired at the SANSA Space Operations division. This data download is acquired from Landsat-7, Landsat-8, Aqua, Terra, Spot-6, Spot-7 and CBERS-4B satellites. Over the past year, 4412 satellite overpasses were successfully acquired. The sum of data acquired from all overpasses is 10767.95 minutes with no lost minutes, SANSA conforms to international standards by analysis of the quantification of a acquired overpasses.

DARK FIBRE FOR IMPROVED TELECOMMS

The successful installation of an end-to-end dark fibre solution between SANSA and Teraco Data Environments will be used for the provisioning of a multiple wavelength transport network of approximately 100Gbps per wavelength. Teraco has three state-of-the-art colocation data centres based in Cape Town, Durban and Johannesburg.

The construction of the fibre route build commenced in November 2017 and the project was completed in March 2018. The total distance from SANSA to Teraco is 117.68km. SANSA to Bryanston is 72.05km and Bryanston to Teraco is 45.63km. Teraco is Africa's only vendor neutral data centre colocation operator. Our presence at Teraco will provide SANSA with easy access to over 40 local and international carriers, content providers, ISP's and managed services providers. All undersea cables are accessible from the data centres, thereby improving latency requirements and connecting Africa to the rest of the world.

This will ensure that SANSA pricing for data transferee and better international access is achieved.

The impact to the international and local stakeholders will be significant.

GNSS: ENC CONFERENCE

In an effort to remain up to date with the latest Global Navigation Satellite System (GNSS) technology and its applications, SANSA attended the European Satellite Navigation Conference, in Lausanne, Switzerland. The conference was also an opportunity to meet with key stakeholders in GNSS including GMV from Spain, who introduced their implementation of the satellite-based augmentation systems (SBAS) specifically aimed at nations that require a low cost implementation solution of SBAS. They are currently deploying the system in Australia. GMV's implementation is similar to SANSA's implementation of SBAS-Africa with the exception of dual-frequency and multi-constellation scenarios. Subsequent meeting with Avanti PLC in London enabled the case for SBAS-Africa to be showcased utilising the logic of the GMV proposal. This proposal is in planning phase for submission to the UKSA International Partnership in Space Programme (IPSP)'s next call.

SANSA AND AIRBUS LAUNCH LOCAL INNOVATION CHALLENGE

SANSA partnered with the Innovation Hub Company, RIIS and Airbus Defence and Space (ADS) to host a Business Development Workshop as part of the second annual Open Innovation Challenge which aims to develop and support innovative South African applications of EO data. The Challenge provided a unique platform for SME's and micro enterprises to stimulate the use of EO for business and decision-making processes. This event focused on developing an understanding of challenges and opportunities within the SA EO economy as well as an understanding of what data is available and how to acquire this data. The innovation challenge attracted the participation of 20 SMMEs. Through the implementation of the challenge, SANSA was able to develop partnerships with the Technology Innovation Agency, the Tshimologong Digital Innovation Precinct and the Innovation Hub Company in order to provide access to participating SMMEs to different parts of the entire innovation value chain. To this end SANSA will be providing further advice on the technical level to participating SMMEs in order to improve their service offering and to introduce these to networks of users. Additionally, the partners in this innovation challenge will be providing, amongst others, incubation services and inclusions in networks to winning SMMEs.

ENGAGING THE SOUTH AFRICAN SPACE SECTOR

SANSA, in collaboration with the DST and the dti, held a Space for National Development Week at the Hartebeesthoek facility. The objective of the week was to engage Earth Observation, Space Science and Space

Engineering stakeholders at all levels in a celebration of achievements of the South African Space community, to forge new collaborative partnerships and to communicate to youth, policy and decision makers about the utility of space for sustainable development. The week consisted of a number of workshops and culminated with an executive networking dinner. In excess of 150 people attended the four days of the Space for National Development Week.

SPACE WEATHER SERVICES FOR THE INTERNATIONAL AVIATION SECTOR

The International Civil Aviation Authority (ICAO) have recently informed all nations of the proposed amendments to the Standards and Recommended Practices (SARPs) in Annex 3 — Meteorological Service for International Air Navigation.

This is an important opportunity for SANSA as the proposed amendments require that space weather information is provided to all aviation operators and becomes part of the general aviation flight plan for all aircraft from November 2018.

There are also consequential amendments to other SARPs that dictate the format and frequency of the information that should be provided. SANSA successfully bid to be a Regional Space Weather provider for aviation in Africa. SANSA is currently in discussions with the Air Traffic Navigation Services (ATNS) in this regard.

UNVEILING OF OPTICAL SPACE LAB

SANSA's robust endeavours to strengthen the country's role in multinational space science research, specifically in upper-atmosphere studies, came to fruition with the unveiling of the Optical Space Research (OSR) Laboratory at the South African Astronomical Observatory (SAAO) in Sutherland on 6 April 2017. This state-of-the-art facility will be used for research and to host space monitoring projects with national and international partners. The OSR Laboratory will add significantly to our knowledge about the Earth's upper atmosphere and will enable SANSA to further leverage the benefits of space science and technology for socio-economic development, environmental conservation and space asset management in service of humanity.

Launch of OSR Laboratory

SOUTH AFRICAN NATIONAL GEOPHYSICAL DATA AND INSTRUMENTATION SYSTEM

SANSA has been developing the South African National Geophysical Data and Instrumentation System (SANDIMS). This new system will allow for SANSA's extensive geophysical instrumentation network to be monitored as well as forming a platform for receiving, archiving, and distributing the extensive data base from a central location. SANSA researchers have been providing metadata to allow for easy access to the data. This is an extensive exercise as information at this level has never been captured before for the geophysical data sets. SANDIMS is being tested externally and will soon be available to all local and international stakeholders.

AVANTI ANTENNA PROJECT

The site establishment of the Teleport Station is nearing its completion. The civil works was successfully completed and the installation of the related infrastructure inside the RF-Shelter (Power, Cooling, Building Monitoring, Fire Suppression etc.) was also completed along with the testing campaign and antenna assembly.

Avanti Antenna project

HBK-07 KU ANTENNA UPGRADE

In 2017 SANSA was contracted to Transfer-orbit support services (TOSS) for the QZS - 2 satellite for 'Launch plus one day'. To successfully carry out this task, SANSA had to utilise the HBK-07 KU antenna, which was originally installed in 1998, with its control system approaching the end of its operational life-span and without any support from manufacturers.

The high customer demand of the KU band antenna necessitated an urgent system upgrade which under normal circumstances would take a few months. Taking into account the technical requirements and a very strict installation period in which the upgrade and commissioning had to be done, the project was finalised within one month enabling SANSA to continue to service the industry with the high quality it is known for.

BUILDING CAPACITY

INTERNATIONAL SPACE FORUM

Scientists from 40 countries descended on Nairobi, Kenya, for the International Space Forum (ISF) in February 2018, where countries presented their plans and potential benefits of respective national space programmes. The forum brought together African ministers, academics and space agencies to encourage a global discussion on capacity building, the role of space in enhancing environmental sustainability and the promotion of space partnerships. An outcome of the Forum was the adoption of an Africa Chapter to the ISF Resolution adopted in Trento, Italy.

The SANSA CEO, in his capacity as the International Astronautical Federation (IAF) Vice President for Developing Countries and Emerging Nations, provided

a keynote speech on capacity building. A highlight was broad agreement from attending African space institutions to forge ahead with the Committee of African Space Institutions initiative, which aims to promote cooperation to develop continental projects in EO, space science, space operations, navigation and space communications for the benefit of its citizens. An African chapter was adopted by IAF as a result and will see formal programmes advancing the challenges of education, capacity building, SDGs and improving space partnerships on the continent.

REMOTE SENSING TECHNOLOGY AND SPACE DEVELOPMENT

In line with SANSA's mandate to expand human capacity development opportunities to the public sector and the entire EO community in South Africa, the agency took a delegation of ten SA scientists to Japan for a four-week training expedition. The delegation represented seven South African institutions; South African Maritime Safety Authority (SAMSA), Transnet National Port Authority, Ekurhuleni Metropolitan Municipality, Eskom, Southern Mapping, National Department of Human Settlements and SANSA.

The training focused on remote sensing technology and space development activities in Japan and sought to strengthen relations between South African and Japanese institutions on space related technologies and applications. Attention was given to Synthetic Aperture Radar (SAR) data for Maritime applications in support of Operations Phakisa and land deformation (i.e. sink hole) observations. This training formed part of the human capital development collaboration between SANSA and Japan International Cooperation Agency (JICA) which has resulted in 30 scientists across the SA EO community gathering knowledge and skills for their institutions.

SPACE WEATHER CAMP 2017

SANSA hosted the international Space Weather Camp (SWC) - a collaboration between SANSA, the University of Alabama in Huntsville (UAH) and German Aerospace Centre (DLR), where eight students from each country learnt about various aspects of space science and technology.

The first leg of the SWC 2017 was hosted by the Centre for Space Plasma and Aeronomics Research (CSPAR) at the UAH in Huntsville, USA and focused on solar physics, solar dynamics and heliospheric physics. SANSA hosted the second leg in Hermanus, where the focus was on space weather, ionospheric physics and geomagnetism.

The camp covered a number of important space science topics, especially those related to space weather, an area of research which is equally relevant to both developed and developing nations due to our increasing reliance on space-based systems and our continued use of high-frequency communication.

Initiatives like these are crucial for building the skills needed for the future and to answer important scientific questions.

SWC students building a receiver antenna for meteorological satellite transmissions

THOUSANDS OF LEARNERS EXPOSED TO THE IMPACT OF SPACE

The Science Advancement Programme reached about 23 000 learners in schools across the country in 2017/18. Outreach teams visited school learners in all provinces to educate them about EO and space science and the exciting career paths to consider when they successfully complete their matric.

The Team conducted science experiments with learners at their school laboratories, or from the SANSA mobile space lab, to provide the scholars with first-hand experience on some of the science behind what is being done at SANSA. The programme aims to inspire interest in the youth to continue pursuing studies in science and technology with the clear view of how these fields impact society. The association between the theoretical elements of the curriculum and their applications in the space industry introduce elements of continuity and provides a platform for the youth to understand the logical conclusion of the learning to application process.

Science experiments with school learners

SHAPING THE FUTURE OF SCIENCE AND TECHNOLOGY

SANSA's bursary programme funds about 80 postgraduate students annually, to create the future capacity needed for the country's space programme and the broader knowledge economy. The Agency partners with universities around South Africa to support space research, and collaborates internationally on a number of projects and initiatives to ensure that the agency has a global presence.

SANSA receives student development funding through National Research Foundation (NRF) and grants from the DST. Since 2015, SANSA's supported student numbers have increased with dedicated support and additional funding. SANSA's reputation and visibility with students has also improved significantly, and the programme is gaining momentum. In particular, the number of Previously Disadvantaged Individuals (PDI) students who are joining the programme has increased extensively in the past two years, particularly in Engineering (a difficult area to attract and retain students) the PDI ratio has grown from 0% to 55%.

SANSA financially supported 71 postgraduate students for the 2017 academic year (78% of the students supported are classified as PDI).

A large part of the success of the student development programme is due to the aggressive recruitment campaigns, and relationship management with universities.

Although the bulk of the student funding is from the DST and NRF, SANSA continues to identify opportunities for international support for students, and aims to diversify its funding streams and student intake. Thirteen SANSA supported students graduated during this financial year with degrees in various space science related fields. Of these students eight received their Honours degrees and five received MSc degrees.

The first SANSA Student Workshop was held in October 2017 at the Hermanus Facility. A total of 44 students attended the four day program where all Masters and Doctoral students presented their projects to researchers and peers. Honours students were asked to present posters of their projects and a panel of judges consisting of PhD students, researchers and engineers adjudicated a poster presentation competition. Guest speakers from the various disciplines (engineering, physics and Earth science) presented lectures and engaged with students regarding new approaches and developments within their scope of work. This was a very successful event funded by the DST, and it is anticipated that this will become an annual event on the SANSA calendar.

GLOBAL PARTNERSHIPS

SANSA attended the 2017 AfriGEOSS Symposium held in Sunyani, Ghana. This second symposium took place under the theme: ***Delivering Earth observation for policy and sustainable societal impact in Africa***. The Symposium was hosted by the University of Energy and Natural Resources (UENR), a relatively newly established Ghanaian University with a rapidly developing faculty in Remote Sensing and EO. AfriGEOSS is an initiative of the African community in GEO aimed at providing a coordination and collaboration network for the development and uptake of EO systems, data, information and knowledge, critical to improving the socio-economic status of in Africa. The symposium was attended by representatives from space agencies, regional organisations, private research and academia as well as public institutions of 31 countries. AfriGEOSS was formally adopted in 2012 at the GEO-Plenary in Brazil and SANSA is currently coordinating the sustainable urban development and the data & infrastructure initiatives for the continent.

SANSA remains an active member of the Committee of Earth Observation Satellites (CEOS) and has played a prominent role as chair of the Capacity Building and Data Democracy Working Group through contribution towards development of methodologies supporting the indicators for the SDGs. The impact of the collaborative effort in EO capacity building with other space agencies has been the training of African scientists and researchers through four training workshops in Tshwane, Libreville and Lusaka in areas of specialty such as SAR image processing to unlock Africa's oceans economy.

The partnership agreement between NEPAD and SANSA has provided a platform to to demonstrate the value of EO science and technology on the African continent. SANSA is developing a web geoportal for NEPAD that will allow the African countries to track development indicators towards the attainment of the Agenda 2063 goals and the United Nations Sustainable Development Goals (SDGs). Through the NEPAD collaboration, African member countries are set to benefit from SANSA's EO capability in food security, water resources management, environmental management, urban monitoring, disaster management and capacity building.

IFAR SUMMIT

SANSA hosted the IFAR Summit that was attended by leaders of the World's Premiere Aerospace Laboratories including NASA, JAXA, DLR, ONERA, TsAGI, CAE and CSIR amongst others, representing a global network of more than 30 000 researchers, to strengthen partnerships to address the world's most pressing challenges in Aviation. IFAR aims to connect research organisations worldwide, to enable the communication and information exchange on aviation research activities and to develop among its members a shared understanding on challenges faced by the global aviation research community.

BRICS REMOTE SENSING SATELLITE CONSTELLATION

The Brazilian Space Agency (AEB), the State Space Corporation "Roscosmos" (ROSCOSMOS), the Indian Space Research Organisation (ISRO), the China National Space Administration (CNSA) and SANSA jointly established the BRICS Remote Sensing Satellite Constellation on the basis of equality and mutually beneficial cooperation. The cooperation aims to establish a remote sensing data sharing mechanism amongst the BRICS nations and avail space technologies to meet the challenges faced by humankind, such as global climate change, natural disasters, technological challenges, and environmental protection. South Africa is the current Chair of the BRICS Space cooperation for 2018. The BRICS Space authorities will expand and deepen space cooperation and collaboration in the emerging markets of space products and services, and further enhance the partnership amongst the nations, with United Nations Office for Outer Space Affairs (UNOOSA) and with other international space organisations.

UNITED NATIONS COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

SANSA attended the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) to support the DST and the dti on South Africa's position in matters of peaceful uses of outer space. A gap has been identified in South Africa's contribution to UNCOPUOS that requires active participation in the programmes of UNCOPUOS that assist in informing South Africa's statements and position in the broader UNCOPUOS activities and guidelines.

SANSA HOSTS INTERMAGNET WORKSHOP

SANSA hosted the international InterMAGNET workshop and council meeting in September 2017. InterMAGNET is a global network of magnetic observatories, of which SANSA's magnetic observatory is a part. The network was established to help maintain global standards for data collection and real-time monitoring of the Earth's magnetic field. Hosting this prestigious event on local shores has certainly positioned South Africa as a relevant and desirable destination for events on the annual space research calendar.

A map of Southern Africa showing the positions of SANSA's four INTERMAGNET observatories HER, HBK, KMH, and TSU which provide real-time data on the Earth's magnetic field

SANSA SCIENTISTS STAR AT INTERNATIONAL SPACE SCIENCE CONFERENCE

The internationally renowned International Association of Geomagnetism and Aeronomy (IAGA) Conference took place in Cape Town and SANSA represented space science in SA. Several prominent SANSA researchers delivered presentations on their research including a keynote address on space science in the polar regions. With major space science projects like the Square Kilometre Array (SKA), the MEERKAT telescope, the South African Large Telescope (SALT), and SANSA's Space Science facilities, South Africa is an ideal location for an international conference of this calibre. After the conference SANSA hosted the third IAGA Winter School, with students from SA, Poland, India, Czechoslovakia, Egypt, Switzerland, Russia, Germany, Mexico, Hungary, Philippines, Brazil, UK, Portugal, Algeria and Japan learning about geomagnetism and participating in projects assigned by SANSA researchers. The projects focused on fluid theory studies of waves in space plasmas; building a software-defined radio receiver antenna; analysing the eruption and propagation of coronal mass ejections from the Sun; and a satellite drag experiment.

SANSA WINS BID TO HOST 2020 SPACE OPERATIONS CONFERENCE

SANSA won the bid to host the 16th International Space Operations Conference in 2020 in South Africa for the first time. This prestigious event has been held biennially the world over since 1990. SANSA has actively pursued the opportunity to showcase South Africa's capabilities of hosting this international event for a number of years.

> The consistent excellence of SANSA's space operations product and services offerings and the country's successful hosting of a number of memorable international events over the last decade and more have helped make this winning bid a reality.

The Space Ops conference fosters technical and management conversations on all aspects of space mission operations. It attracts technologists, scientists and managers from the international space mission operations and ground systems community, as well as representatives from global and local space agencies, commercial operators, academic and research institutions and industry.

The 2020 Space Operations Conference will be held at the Cape Town International Convention Centre

INTERNATIONAL ASTRONAUTICAL CONGRESSES

SANSA participated in the ***68th International Astronautical Congresses (IAC)*** in Australia in partnership with the dti; the DST; and the SKA on a custom-built SA pavilion exhibition. The exhibition showcased South Africa's Space Industry players and the space capability within South African universities. SANSA participated in a key plenary session -"The Role of Space Agencies in Support of Emerging Countries" and formed part of the International Space Education Board Heads of Agency panel with students.

During this period SANSA had engagements with the following space agencies:

European Space Agency (ESA) - The discussion with ESA centred on progressing towards formalising the SANSA - ESA relationship with the possibility of SANSA assuming ESA associate membership.

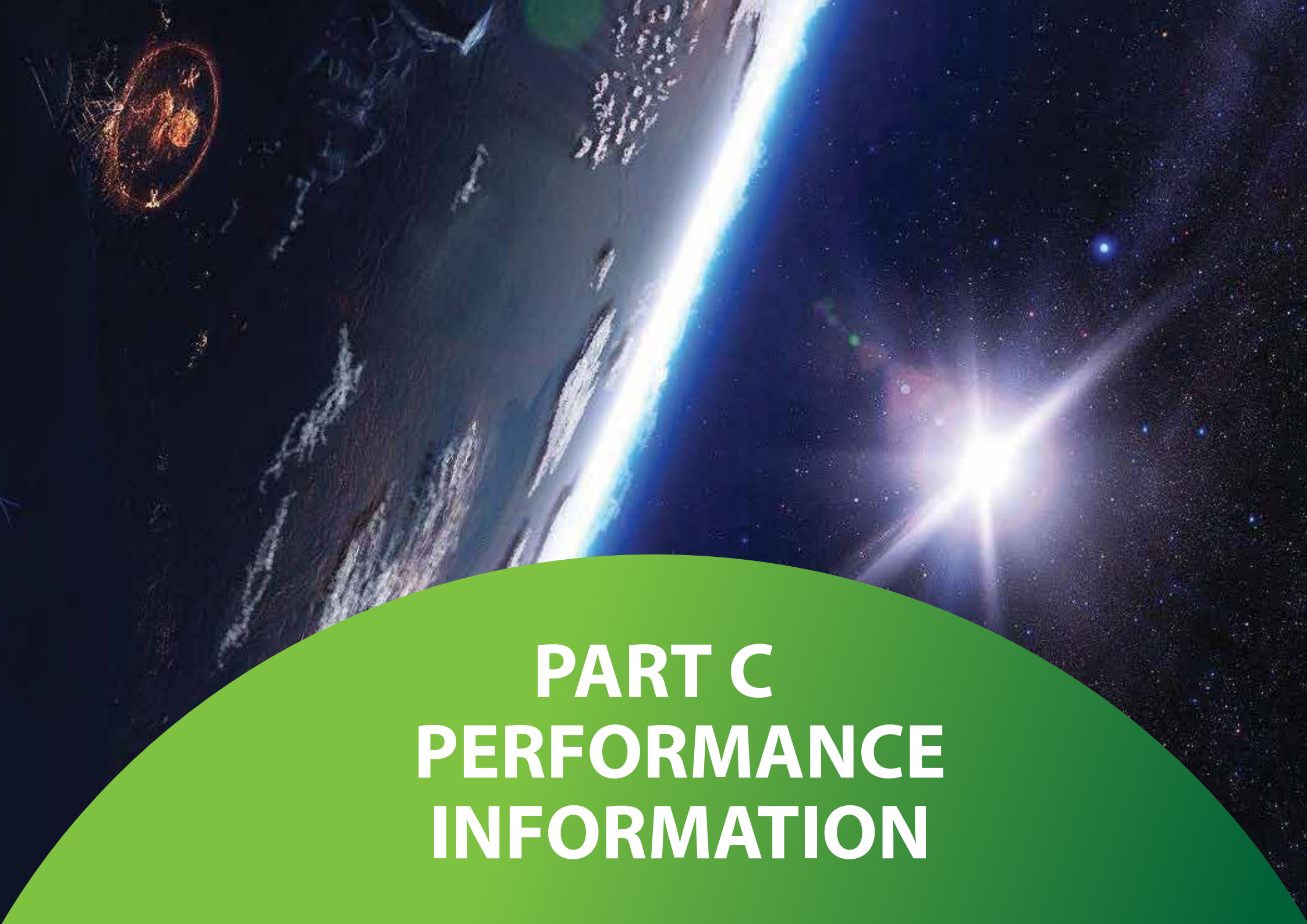
German Aerospace Center (DLR) - A signing ceremony was held on the renewal of the SANSA DLR Framework Agreement signed in July 2012 and which had lapsed in July 2017.

International Astronautical Federation - SANSA's nomination and submission of its CEO as a candidate for consideration as one of the IAF Vice Presidents was accepted and the CEO attended a scheduled associated interview. The SANSA CEO was shortlisted and subsequently endorsed by the IAF General Assembly with three other candidates as IAF Vice Presidents. The CEO assumes the portfolio for Emerging Countries.

NASA Education - The Associate Head of NASA Education extended a hand to SANSA on all matters pertaining to the International Space Education Board (ISEB) to assist SANSA in taking advantage of the opportunities provided through the ISEB membership partnership.

National Space Research and Development Agency (NASRDA) - SANSA and NASRDA discussed the specifications for a new MoU and this MoU was signed in December 2017.

State Space Agency of Ukraine (SSAU) - SSAU and SANSA revisited the MoU signed between the two agencies during the past IAC. Reciprocal agency visits was agreed in order to fully appreciate each agency's capabilities. SANSA has an interest in SSAU's launch capabilities and the Heads of each Agency agreed on further information exchange on this matter.



PART C
PERFORMANCE INFORMATION

11. PERFORMANCE INFORMATION

AUDITOR'S REPORT: PREDETERMINED OBJECTIVES

The external auditors currently performs the necessary audit procedures on the 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 page 104 of the Report of the Auditors Report, published as Part F: Financial Information.

SITUATIONAL ANALYSIS

SERVICE DELIVERY ENVIRONMENT

SANSA's mandate is derived from the SANSA Act No. 36 of 2008. One of its main functions is to promote the peaceful uses of space, support industrial development, foster research, advance human capital development and grow and strengthen international co-operation. For SANSA to be able to contribute to service delivery, more than 80% of its targets must be met. SANSA achieved 85% of the targets and the remaining 15% of the targets for the 2017/18 financial year were not met.

One of the highlights for this year was the significant number of students and interns supported by SANSA. More than 75 students received SANSA support this past financial year. The number of learners reached during the space awareness campaigns was also exceeded. SANSA was able to deliver on the Government policy support tools that are meant to advise government on new policy directions and global technological trends. During this year SANSA improved the competitiveness of the local space industry with support for SMEs being increased.

SANSA's ability to deliver on its full mandate was hampered by insufficient or lack of funding. The EO-Sat1 mission requires urgent additional funding to complete the project to the Flight Model stage. The national Mosiac that is an annual commitment by SANSA needs funding in order to successfully produce it from the acquired data. Funding is also required to honour the different MoUs entered into with other space agencies or through international co-operations. SANSA has approached the Shareholder about the funding issue and discussions are at an advanced stage with National Treasury and the DST to determine interventions needed to address the Institution's financial situation.

The number of direct jobs supported has improved due to the jobs supported under both the EO-Sat1 and the Cubesat Programme. SANSA is proud to announce the successful completion of ZACube-2 by CPUT. This Cubesat Programme is a pre-cursor mission for a constellation of cubesats to be used for the Operation Phakisa Programme. ZACube-2 will track ships in our oceans using the Automated Identification System (AIS) and monitor veldt fires using a K-line sensor.

ORGANISATIONAL ENVIRONMENT

SANSA embarked on a new strategic direction arising from the development of a new Strategic Framework. This Strategic Framework is the new vision of the organisational that is aimed at repositioning SANSA as a high performance organisation with an increased focus on the African continent. The development of the new Strategic Framework was followed by the alignment of the organisational goals to reflect the new direction. The changes in the strategic direction of the organisation lead to the reduction of the strategic goals from seven to five organisational goals. These changes will be formalised through the SANSA Strategic Plan, which will be completed in the second quarter of the 2018/19 Financial Year.

As part of this process, SANSA engaged staff in a process of job re-alignment. This HR process is aimed at improving the efficiencies in the organisation by making sure that employees manage the change and are well positioned to deliver on their responsibilities. The re-alignment project is ongoing and will be completed in the next financial year. Management is workshopping affected employees in order to ensure a smooth realignment process.

KEY POLICY DEVELOPMENTS AND LEGISLATIVE CHANGES

There have been no changes to the policy environment or legislation on governance of the Agency. All other National Treasury Guidelines and/or new policy affecting the financial controls and accountability structures for the organisation are addressed under Part E: Financial Information of this annual report.

STRATEGIC OUTCOME ORIENTED GOALS

This section is addressed under each programme

For the 2017/18 Financial Year, SANSA had 20 KPIs and these are expounded on against the seven Strategic Goals.

GOAL 1: PRODUCTS AND SERVICES

1. Five high-impact space products and services:
    - Operation Phakisa,
    - National SPOT Mosaic,
    - Vegetation Index Map,
    - Space Weather Bulletins, and
    - Magnetic Technology Services.
2. Three decision or policy support tools:
    - The size and health of the South African space sector and proposed growth,
    - Earth observation and food security, and
    - Safety and security applications from a magnetically clean environment.

GOAL 2: HIGH-IMPACT R&D

3. Research productivity score of 1200:
    - Earth Observation 240, and
    - Space Science 960.

Makeup of research productivity score:

a. Publications (papers, books, chapters in books, conference proceedings, technical reports);

b. Research funding;

c. Students graduated (MSc and PhD); and

d. Researcher ratings.

GOAL 3: TRANSFORMATION AND HUMAN CAPACITY

4. 12000 young people directly engaged through science awareness and outreach.
5. 75 students supported for formalised training, with 60 students from previously disadvantaged institutions (PDI):
    - 80% PDI students, and
    - Science, engineering and technical fields.

GOAL 4: GROW THE SPACE INDUSTRY

6. Successful satellite pass monitoring rate of 98% (~4500 passes).
7. R44m commercial income generated from space operations.
8. Five percent (R2.2m) of income generated invested in other SANSA programmes.
9. 55 direct jobs supported.
10. Preliminary design review of EO-Sat 1.
11. Contract expenditure of R65m to local space industry for core space projects.
12. Contract expenditure of R14.2m earmarked to small and medium enterprises.

GOAL 5: GLOBAL PARTNERSHIPS

13. Global partnerships contributing an equivalent of 3% to the SANSA non-commercial revenue stream:
    - 14 MoUs with agencies outside of Africa,
    - 6 MoUs with agencies within Africa, and
    - 7 MoUs with institutions in South Africa.

GOAL 6: GROWTH AND SUSTAINABILITY

14. R251m non ring-fenced revenue.
15. Estimated monetised impact put on hold pending further analysis on methodology to be used.
16. 70% national stakeholder awareness.
17. 50% of National Space Programme (NSP) implemented.

GOAL 7: HIGH PERFORMANCE AGENCY

18. Four initiatives implemented that will enhance organisational performance.
19. 65% of permanent staff from designated groups in D to F grades.
20. One percent (R400k) of operating expenditure invested in staff training and development.

CONSOLIDATED PERFORMANCE INFORMATION

Out of the 20 KPI's, SANSA managed to achieve 17 KPI's and three KPI's were not achieved. SANSA's overall performance to date translates as 85% achieved, and 15% not achieved.

Goal		Key Performance Indicator	Reporting Cycle	Annual Target	Annual Actual	Reasons for Variance
Goal 1	Address South Africa's challenges through space services and products	M1.1. The number of national high-impact products and services	Quarterly	5	4	Target not achieved for one deliverable Data acquisition and processing to enable use of SPOT 6/7 data by users is complete and already being disseminated. The stage of producing the national mosaic is at 75% completion hence target not fully achieved.
		M1.2. The number of government decision or policy support tools	Annually	3	3	Target achieved with all three policy documents approved
Goal 2	Lead high-impact collaborative R&D on a national scale	M2.1 The national research productivity score for space support R&D (This productivity score is based on a function of research funding sourced + publications (journals, books, reports, proceedings) + students graduated + research rating status)	Quarterly	1 500	1 693	Target achieved and exceeded Publications were lower in 2017/18 than in previous years due to reduction in available funding, and long lead times of journals. Funding was also lower which impacted the score, and most students will only graduate in 2018/19
Goal 3	Develop national human capacity and ensure transformation	M3.1 The number of youth directly engaged through science awareness & outreach activities (This excludes arms -length engagement with the youth e.g. a visit to one of SANSA's exhibition stands)	Quarterly	12 000	23 246	Target achieved and exceeded

Goal		Key Performance Indicator	Reporting Cycle	Annual Target	Annual Actual	Reasons for Variance
Goal 3	Develop national human capacity and ensure transformation	M3.2 The number of PDI students supported for formalised training (This excludes short courses and focuses on students that are registered for some formal training for a degree, diploma or certificate within the South African National Qualification Framework)	Quarterly	PDI Target 60	59	
				Total Students 75	75	Target achieved for total number of students supported.
				PDI Proportion 80%	78%	PDI target of 80% not met
Goal 4	Enhance the competitiveness of the South African space industry	M4.1.1 Successful satellite pass monitoring rate for Earth observation	Quarterly	4412	99.88%	Target achieved and exceeded
				4500		
				98%		
Goal 4	Enhance the competitiveness of the South African s pace industry	M4.1.2 Total commercial income generated per year from space operations activities	Annually	R44 million	R85 million	Target achieved and exceeded The last quarter exceeded all expectations. Mainly due to extra and unpredicted launches
		M4.1.3 Total proportion of space operations commercial international income invested in other SANSA programmes	Annually	Investment: R2.2 million	R3 million	Target achieved Additional income in the last quarter increased total value contribution
				Commercial International Income: R44 million	R60 million	
				Proportion: 5%	5%	

Goal		Key Performance Indicator	Reporting Cycle	Annual Target	Annual Actual	Reasons for Variance
Goal 4	Enhance the competitiveness of the South African s pace industry	M4.2.1 The number of direct jobs supported externally through SANSA programme contracting	Annually	55	62	Target achieved and exceeded due to additional jobs supported from the ZACube project
		M4.2.2 The achievement of key project milestones in the EO-Sat 1 development	Annually	Preliminary Design Review (PDR) completed for the Space System in preparation for Critical Design review in 2018/19	Preliminary Design Review (PDR) Completed	Target achieved PDR Milestone completed as planned
Goal 4	Enhance the competitiveness of the South African s pace industry	M4.2.3 The total contract expenditure to SMEs for core space projects	Annually	R14.2 million	R16.2 million	Target achieved and exceeded Additional contribution from hosting the ISRSE conference in addition to the EO-Sat and ZACube project contributions to SME's.
Goal 4	Enhance the competitiveness of the South African s pace industry	M4.2.4: The total contract expenditure to the broad space related industry for core space projects	Annually	R65 million	R 78 million	Target achieved and exceeded Total spend on the EO-Sat and ZACube projects
Goal 5	Develop active global partnerships	M5.1 The equivalent revenue generated through partnerships as a proportion of the SANSA non-commercial operating revenue	Quarterly	3%	R4 million R99 million 4%	Equipment donation for a campaign added to the final value

Goal		Key Performance Indicator	Reporting Cycle	Annual Target	Annual Actual	Reasons for Variance
Goal 6	Ensure the growth and sustainability of SANSA	M6.1 Total non-ring-fenced SANSA revenue	Annually	R251 million	R235 million	Target not achieved Public sector contracts were much less than anticipated even though foreign income exceeded estimates substantially
		M6.2 Estimated monetised impact from space related activities	Annually	Analysis and inter-pretation of key data; Develop complete analytical model on quanti-fication of space value. The model will allow for dynamic changes to the industry Finalise report on the monetised impact of space related activities	Nil	Target not achieved, due to capacity constraints (people and financial resources)
		M6.3 SANSA's stakeholder awareness	Annually	70%	82%	Target achieved and exceeded Survey conducted and results indicated 82.35% awareness of SANSA's activities
		M6.4 High-level NSP implementation progress status	Annually	50%	53%	The NSP has not yet been funded as a programme. The current implementation is limited to operational programme. There is no officially approved NSP

Goal		Key Performance Indicator	Reporting Cycle	Annual Target	Annual Actual	Reasons for Variance
Goal 7	Transform SANSA into a high performance Agency	M7.1 Implementation of identified initiatives that enhance organisational performance	Quarterly	4	4	Target achieved
		M7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades	Quarterly	65%	79.2%	Target achieved
		M7.3 Proportional (1%) of total operating expenditure invested in staff training and development	Quarterly	1%	1%	Target achieved

Table 1: Consolidated Performance Table

PERFORMANCE INFORMATION BY PROGRAMME

PROGRAMME 1: ADMINISTRATION

PURPOSE

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

STRATEGIC FOCUS

GOAL 1: ADDRESS SOUTH AFRICA'S CHALLENGES THROUGH SPACE SERVICES AND PRODUCTS:

- Long-term space programme studies and planning; and
- Space programme coordination.

GOAL 6: ENSURE THE GROWTH AND SUSTAINABILITY OF SANSA:

- Effective strategic planning, implementation and performance management;
- Strategic relevance and impact;
- Driving new business development;
- Ensuring financial sustainability;
- Marketing and communication; and
- Efficient financial management and strategic procurement.

GOAL 7: TRANSFORM SANSA INTO A HIGH PERFORMANCE AGENCY:

- High-level talent management;
- Operation efficiency and delivery; and
- Good corporate governance.

ADMINISTRATION PROGRAMME PERFORMANCE OUTPUTS 2017/18

Administration Programme					
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/ Measure**	**Annual Target**	**Annual Actual**	**Variance & comment**
Goal 1: Address South Africa's challenges through space services and products	S1.2 Provide government with effective policy or decision tools and support	M1.2 The number of government decision or policy support tools	A report on "The Size and Health of the South African Space Sector and Proposed Growth"	Policy brief completed	Target achieved
Goal 6: Ensure the growth and sustainability of SANSA	S6.1. Ensure that SANSA has annual measurable growth and is sustainable	M6.1 Total non-ring-fenced SANSA revenue	R251 million	R232 million	Target not achieved as targeted public sector contracts were much less than anticipated even though foreign income exceeded estimates substantially
		M6.2 Estimated monetised impact from space related activities	Develop complete analytical model on quantification of space value. The model will allow for dynamic changes in the industry	Not done	This target will be moved to the next FY
		M6.3 SANSA's public value awareness	70%	Survey conducted and results indicated 82.35% awareness of SANSA's activities	Target achieved
	S6.2. Ensure the effective implementation of the NSP	M6.4. High-level NSP implementation progress status.	50%	53%	The current implementation is limited to operational programme. There is no officially approved NSP

Administration Programme					
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/ Measure**	**Annual Target**	**Annual Actual**	**Variance & comment**
Goal 7: Transform SANSA into a high performance Agency	S7.1. Ensure that SANSA has been optimised for high performance	M7.1 Implementation of identified initiatives that enhance organisational performance	Coordination and quarterly reporting on the activities of the national space programme	Assessment done	The development of core technologies as part of the EO-Sat1 programme has been hindered by funding challenges
			Long term capital maintenance and investment framework and implementation plan	Long term capital investment framework approved. Implementation plan contained in the new strategic framework	Target achieved
			Develop and implement new Performance Management System (PMS)	PMS developed and implemented	Target achieved
			Complete implementation of new ERP system	ERP System about 90% implemented	Target achieved Challenges experienced in data migration
Goal 7: Transform SANSA into a high performance Agency		M7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades	PDI employees (D-F grades): 16	15	Target achieved
			Total employees (D-F grades): 20	15	
			Proportion: 80%	100%	
		M.7.3 Proportional (%) of investment into staff training & development against operating expenditure	Training &Development Expenditure of R400 000	R 617 780	Most training expenses are incurred in the fourth quarter.
			Total Operating Expenditure:	R 56 million	
			R40 million		
			Proportion: 1%	1%	

Table 2: Administration Programme Performance

KEY ACTIVITIES AND IMPACT

SANSA TEAM FOCUS

The SANSA team section of the report provides an update on key human resources and workforce actions undertaken across the organisation during the period under review and can be reviewed in greater detail under Part E: Human Resource Management.

SANSA STUDENT DEVELOPMENT PROGRAMME

SANSA's Student Development Programme focuses on building a skills pipeline through the support of postgraduate students (Honours, Masters, Doctoral) within space related areas or fields that are required within the space programme.

SANSA received student development funding through NRF grants, and the DST HCD grant. SANSA has financially supported 64 postgraduate students for the 2017 Academic year (81% of the students supported are classified as PDI), and a total of 71 postgraduate students during the 2017/18 financial year.

SANSA has awarded postgraduate bursary funding to a total of 71 postgraduate students for the 2018 academic year. This includes continuing postgraduate students as well as six new Honours students and is possible only through support from the DST HCD grant. Four more students were supervised by SANSA, which makes a total of 75 students that were supported by SANSA during the 2017/18 financial year.

The National Astrophysics and Space Science Programme (NASSP) summer school was held at the SANSA Hermanus worksite from 4 – 8 February 2018. The school was attended by 26 NASSP Honours students, and the aim of the school was to introduce Honours students who are newly enrolled in NASSP to the different areas of space science research conducted at SANSA. The students attended morning lectures on a wide variety of space science related topics such as plasma physics, geomagnetism, radio wave propagation in the ionosphere and electrodynamics of the upper atmosphere. The afternoon activities were more hands-on and the students attended a computer-based laboratory session and engaged in two fun-filled outdoor activities such as shooting potatoes using a potato gun and hiking in the Fernkloof Nature Reserve to search for geocaches using a GPS receiver.

A graphical representation of the supported student demographics for the 2017\2018 financial year is shown in the figures below:

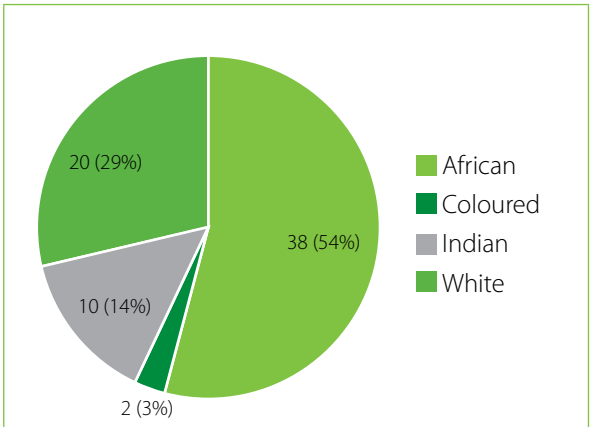


Figure 1: Demographic distribution of supported students

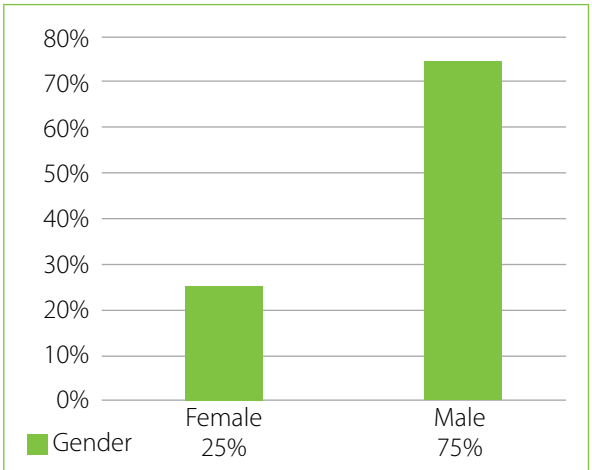


Figure 2: Gender distribution of supported students

COMMUNICATIONS AND STAKEHOLDER MANAGEMENT

COMMUNICATIONS

The annual stakeholder survey was distributed for feedback from stakeholders on their awareness of SANSA and its programmes following the implementation of the annual external communication plan. The results of the survey indicate an 82.35% awareness of the SANSA programmes from the majority respondents who were from Government departments or entities. The most familiar programme at SANSA is Earth Observation, followed by Space Science and Space Operations, which aligns to the majority survey respondents from Government.

Other results indicate a desire from stakeholders for increased interaction with SANSA with a neutral to good

impression from existing interactions. All respondents would desire more information from SANSA with the most recommended information being programme updates, proposals and partnership opportunities. The best platform to engage these stakeholders is at events and exhibitions, followed by newsletters and digital platforms.

STAKEHOLDER ENGAGEMENT

As a member of the Committee on Earth Observing Satellites (CEOS), SANSA attended the CEOS Strategic Implementation Team meeting in Paris that was aimed at enabling SANSA to begin contributing to the CEOS strategic direction. In the past SANSA's role in CEOS has been specific to the Working Group on Capacity Building and Data Democracy. The opportunity to contribute and actively participate in this meeting translates to a better understanding of CEOS's contribution to GEO. This provides insight on how best SANSA could mobilise the South African EO community to participate jointly with SANSA and other Space Agencies and associated/ affiliated institutions in responding to the GEO Work Programme.

SANSA met with the Organisation for Economic Cooperation and Development (OECD) Space Forum. This forum assists space-related agencies, private sector and governments in effectively and efficiently tracking statistical progress on developments in the global space sector. Progress is tracked alongside the economic significance of space infrastructure and the global impact thereof. The discussion centred on the methodology used to put together the *OECD Space Economy at a Glance*, as this provides an objective comparison of South Africa's space developments with that of the rest of the world. Discussions furthered on how this could potentially be extended to Africa.

SANSA in partnership with the British High Commission in South Africa, supported two space industry companies (one with an EO focus and the other a space engineering focus); and the CSIR on a visit to the UK to attend the UK Space Conference in Manchester. The trip also included a visit to the Harwell Space Centre for a full day conference with UK Space companies to explore industrial space partnership opportunities between the UK and South Africa.

SANSA had co-hosted and judged the 6th Space Law Moot Court with the dti in May 2018 and then sponsored the accommodation of the Africa winning team from University of Pretoria at the finals in Australia. The SA team were unfortunate to not progress beyond the semi-finals, however the Team did us proud.

SANSA participated in the 68th International Astronautical Congresses (IAC) in Australia and in partnership with the dti; DST; and the SKA the four contributed to the SA Pavilion exhibition. The Pavilion showcased South Africa's Space Industry players and the space capability within the South African universities.

SANSA participated in the Science Forum South Africa (7-8 December 2018) and UN/South Africa Symposium on Basic Space Technology Initiative (BSTI) (11-15 December 2018). At the Science Forum SANSA had an exhibition stand and hosted a session focused on the African space policy and strategy and their implementation on the continent. This was well subscribed to considering the early morning scheduling and the response was positive and supportive from local and regional delegates.

The China Center for Resources Satellite Data Application (CRESDA); the Institute of Remote Sensing and Digital Earth(RADI) - China; the Instituto Nacional de Pesquisas Espaciais (INPE) – Brazil; and SANSA have jointly submitted a call in response to the BRICS STI Framework Programme - Coordinated call for BRICS multilateral projects. The chosen thematic area is: Prevention and monitoring of natural disasters and the title of the cooperative research project is Drought and Floods Monitoring Using BRICS Satellite Constellation.

	STAKEHOLDER	INSTRUMENT OF ENGAGEMENT	STRATEGIC INTENT	AREAS OF COOPERATION
1	German Space Agency (DLR, (Germany)	Framework Agreement	Aimed at building on the strengths of DLR to advance SANSA and to develop mutual beneficial projects.	EO, SS, SO, Capacity Building.
2	National Aeronautics and Space Administration (NASA, USA)	Agreement	A mechanism through which SANSA is able to send South African students to NASA for internship.	Science advancement.
3	Joint Research Commission (JRC, Belgium)	MoU	Aimed at contributing more effectively to the exploitation of remote sensing technologies. This includes desertification, water management and crop monitoring.	EO.
4	CRESDA/INPE (China/ Brazil)	MoU	Allows SANSA to distribute CBERS data to Africa.	EO.
5	UK Space Agency (UKSA, UK)	MoU	The MoU provides a framework for mutual beneficial collaborative projects in space.	EO, SS, industry development.
6	Chinese Space Administration (CNSA, China)	MoU	The MoU provides a framework for mutual beneficial collaborative projects in space.	EO, SS, industry development.
7	State Space Agency of Ukraine (SSAU, Ukraine)	MoU	Framework for mutual beneficial collaborative projects in space.	EO, SS, industry development.
8	National Resource Canada (Nana, Canada)	MoU	Aimed at developing and implementing joint projects in the space.	EO, SS.
9	European Space Agency (ESA, Europe)	Agreement (under discussion)	Aimed at developing and implementing joint projects in space. These include opportunities presented include staff exchange programmes, training and hosting of a workshop on business incubator models. The discussion with ESA also centred on progressing towards formalising the SANSA ESA relationship with the possibility of SANSA assuming ESA associate membership.	EO, SS, SO, industry development, science advancement.
10	Canadian Space Agency (CSA, Canada)	MoU/ Framework Agreement (under discussion)	Aimed at developing and implementing mutual beneficial projects in space.	EO, SS, SO, industry development.
11	Brazilian Space Agency (AEB, Brazil)	MoU (under discussion)	Aimed at developing and implementing joint projects with universities and industry on CubeSat development projects.	SE, industry development.
12	Centre National deludes Spatulas (CNES)	MoU (under discussion)	Aimed at developing and implementing joint projects in space.	EO, SS, SO, industry development, science advancement.
13	Algerian Space Agency (ASAL, Algeria)	MoU	Joint space projects.	EO, SE, capacity building.
14	Namibia University of Science and Technology (Pond, Namibia)	MoU	Joint space projects.	EO, SE.
15	National Centre for Research (NCR, Sudan)	MoU (under discussion)	Collaboration on the margins of the ARMC, Sudan Space Policy development, training and human capital development in EO and Space Engineering.	EO, SE.

	STAKEHOLDER	INSTRUMENT OF ENGAGEMENT	STRATEGIC INTENT	AREAS OF COOPERATION
16	National Authority for Remote Sensing and Space Science (NARSS, Egypt)	MoU (under discussion)	Collaboration on the margins of the ARMC and joint microsatellite development.	EO, SE.
17	Council for Scientific and Industrial Research (CSIR, South Africa)	MoU	A requirement to establish a CoC in support of the satellite development strategy and payload development aspects of the EO-Sat1 mission.	EO, SS, SE, capacity building.
18	South African Weather Service (SAWS, South Africa)	MoU	Facilitates effective and appropriate strategies for the systematic improvement of relevance of space applications with respect to climate and weather services in the country.	EO, SS, SO, capacity building.
19	DENEL, South Africa	MoA	Denel SpaceTeq are commercial partners for the development of EO-Sat1.	Satellite Build Programme.
20	Statistics South Africa (STATS SA)	Contract	For the development of data products and related services that will enable the successful execution of the national community survey that will be undertaken in 2016.	EO.
21	Agricultural Research Council (ARC)	MoU (under discussion)	Facilitation for joint collaboration in GEO related activities and agricultural research.	EO.
22	Department of Water and Sanitation (DWS)	Ongoing collaboration	Provision of satellite imagery in support of water services in the country, water related value-added products and provision of remote sensing training.	EO.
23	Department of Public Service and Administration (DPSA)	MoU	Provision of satellite imagery in support of government service delivery.	EO.
24	Council for Geoscience	MoU (ready for signature)	Joint geoscientific projects.	EO, SS.
25	New Partnership for Africa's Development (NEPAD) Agency	MoU concluded	Provision of a support role to the NEPAD Agency using EO technology.	EO.
26	National Lotteries Commission (NLC)	MoU	Data provision to the NLC for the monitoring of NLC infrastructure projects	EO.
27	Technology Innovation Agency (TIA)	Cooperation Agreement	The identified areas include: The establishment of a Space Cluster Programme Collaboration in the Innovation Challenge Programme The establishment of a Centre of Competence in Space Technology as an enabler for academia	Space Industry
28	Gabonese Agency for Space Studies and Observations (AGEOS)	Cooperation Agreement	The cooperation is primarily focused on Earth Observation and adhoc ground station support services.	EO, SO.
29	National Space Research and Development Agency of Nigeria (NASRDA).	MoU	Aim to prioritise joint mission development and human capital development	

Table 3: Consolidated stakeholder engagement for 2017/18

PROGRAMME 2: EARTH OBSERVATION

PURPOSE

The Earth Observations Programme is responsible for the collection, processing, archiving and distribution of Earth observation data, value-added data products and services for societal benefit. SANSA maintains an Earth observation portfolio of sensors, provides an R&D platform in Earth observation technologies, conducts satellite image processing and correction, and supports human capital development in Earth observation and science advancement.

STRATEGIC FOCUS

GOAL 1: ADDRESS SOUTH AFRICA'S CHALLENGES THROUGH SPACE SERVICES AND PRODUCTS:

- National geospatial decision support data products including the Earth Observation Data Centre (EODC):
- National land use, land cover base maps (National Human Settlement Map; National Water Map; National Vegetation Map; National Disaster Management Map); and
- Marine Information Services (Operations Phakisa).

GOAL 2: LEAD HIGH-IMPACT COLLABORATIVE R&D ON A NATIONAL SCALE:

- Remote sensing research; and
- Data management and algorithm R&D.

GOAL 3: DEVELOP NATIONAL HUMAN CAPACITY AND ENSURE TRANSFORMATION:

- Science outreach and awareness;
- Student and intern training;
- Student funding;
- Fundisa resources; and
- University support.

GOAL 5: DEVELOP ACTIVE GLOBAL PARTNERSHIPS:

- Development and servicing of national and international partnerships; and
- Joint projects with external partners.

GOAL 7: TRANSFORM SANSA INTO A HIGH PERFORMANCE AGENCY:

- Ensuring equity and transformation; and
- High-level institutional performance.

EARTH OBSERVATION PROGRAMME PERFORMANCE OUTPUTS

Earth Observation Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Variance & Comment**
Goal 1: Address South Africa's challenges through space services and products	S1.1 Lead and facilitate the creation of high-impact products and services to address society's needs and challenges	M1.1 The number of national high-impact products and services	1. Operation Phakisa: Contribute to the implementation of the national ocean and coastal information system and extending EO capacity	100% of data acquisition plan achieved, awaiting Board approval and tender process.	Target achieved.
			2. National geospatial decision support data products	Not achieved	Target not achieved. Though the data acquisition and processing to enable use of SPOT 6/7 data by users was completed and already being disseminated, the stage of producing the national mosaic not achieved.
			3. National land-use and land-cover base maps (information products)	100% vegetation indices national maps achieved	Target achieved.
	S1.2 Provide government with effective policy or decision tools and support	M1.2 The number of government decision or policy support tools	Policy brief on Earth Observation and Food Security	Policy brief on Earth Observation and Food Security	Target achieved.
Goal 2: Lead high-impact collaborative R&D on a national scale	S2.1 Increase the national space research output	M2.1 The national research productivity score for space supported R&D (This productivity score is based on a function of research funding sourced + publications (journals, books, reports, proceedings) + students graduated + research rating status)	300	807	Target achieved. Variance due to higher than anticipated approval of publications and research grants.

Earth Observation Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Variance & Comment**
Goal 3: Develop national human capacity and ensure transformation	S3.1. Increase youth awareness of science	M3.1 The number of youth directly engaged through science awareness & outreach activities (This excludes arms-length engagement with the youth e.g. a visit to one of SANSA's exhibition stands)	4800	10362	Target achieved. Variance due to realised opportunities for direct school visit.
	S3.2 Support students with a transformation agenda	M3.2 The number of PDI students supported for formalised training (This excludes short courses and focuses on students that are registered for some formal training for a degree, diploma or certificate within the South African National Qualification Framework)	PDI Target: 16	20	Target achieved. Variance on PDI proportion exceeded due to high number of PDI applicants received.
			Total Students: 20	20	
			PDI Proportion: 80%	100%	
Goal 4: Enhance the competitiveness of the South African space industry	S4.2 Grow the national space industry	M4.2.3 The total contract expenditure to SMEs for core space projects	R1.2 million	R 4.7 million	Target achieved. Variance due to ISRSE37 Conference logistics contracted to SMEs.
Goal 5: Develop active global partnerships	S5.1. Leverage a significant benefit for the space programme through global partnerships	M5.1 The equivalent revenue generated through partnerships as a proportion of the EO non-commercial operating revenue	Stakeholder Income: R1.8 million	R 2.9 million	Target achieved. Variance due to CBERS data receiving agreement encompassed by anon-commercial revenue of R30 million met.
			Non-Commercial Revenue: R 60 million	R 65 million	
			Proportion: 3%	4%	Target achieved.

Earth Observation Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Variance & Comment**
Goal 7: Transform SANSA into a high performance Agency	S7.1. Ensure that SANSA has been optimised for high performance	M7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades	PDI employees (D-F grades): 11	12	Target achieved.
			Total employees (D-F grades): 13	12	
			Proportion: 80%	100%	
		M.7.3 Proportional (1%) investment into staff training & development against operating expenditure	T&D Expenditure: R371 000	R 405 354	Target not achieved. Variance due to SO/EO expenses and the ISRSE37 conference. expenses. The 1% target not met because of increased operating expenditure.
			Total Operating expenditure (Excl. SPOT license fees): R37 086 000	R 58.5million	
			Proportion: 1%	0.7%	

Table 4: Earth Observation Programme Performance

KEY ACTIVITIES AND IMPACTS

DATA MANAGEMENT INFRASTRUCTURE AND PROCESSING TOOLS

Earth observation is dependent on effective and capable ICT infrastructure and processing systems for seamless operations, from data acquisition to dissemination. The installation project for the 870TB storage and control servers is now complete with the storage capacity available for use. The system is implemented with a redundant array of independent disks, though this will result in less storage capacity, the redundancy is import as it allows fault tolerance of failed hard disks. Data loss challenges are therefore minimised.

Data discovery and access by stakeholders is as important as data acquisition and archiving. The satellite imagery acquired from the various sensors therefore is mapped into the SANSA Online Catalogue to enable users to find and order the data hosted in the SANSA Earth Observation Data Centre.

The in-house developed Landsat 8 processor was successfully deployed and is automatically processing Landsat 8 scenes daily. The system has automated workflow to produce Level 1 terrain corrected imagery (L1T and L1GT) imagery. To date, almost 1000 scenes covering the SADC region have been processed since November 2017.

A proposal on improving EO Systems Usage was submitted for approval. This is supported by multiple dimensions: User levels; Technology Levels; Applications Environments; and EO storage capacities. A systems capacity growth plan was also presented, addressing the move from server to cloud. The benefit will be on the multi-processing capabilities and enhancing the employee's usage of the systems.

SANSA has further successfully registered and approved the Principal Investigator status on the Centre for High Performance Computing (CHPC) environment. Processing capability and storage has been granted to SANSA for use.

DATA ACQUISITION

The National Sensor Portfolio managed by SANSA includes direct reception of a number of sensors. This is supported by demodulators at the ground station at SANSA Space Operation facility. A total of 32 081 images were acquired and are available in the SANSA Earth Observation Data Centre. The table below illustrates the current direct reception national sensor portfolio:

Sensor Name	Images Acquired
CBERS-4	26 130
Landsat 7	413
Landsat 8	1 879
MODIS - Terra and Aqua	2 397
SPOT-6/7	1 262
Total	**32 081**

Table 5: Images available on the SANSA EODC Archive

DATA DISTRIBUTION

A total of 7780 images, from various satellite sensors, were distributed (see Figure below), with SPOT 6/7 being the majorly distributed data, which can be attributed to the multi-user single licence agreement.. Data was distributed to various institutions including universities (e.g. University of Fort Hare, University of Johannesburg, University of Pretoria, University of Stellenbosch, etc.), government departments, municipalities and state institutions (e.g. Department of Agriculture, Forestry and Fisheries, Ngaka Modiri Molema District Municipality, Thabo Mofutsanyane District Municipality). Private sector companies such as Solid Earth and Space Commercial Services also received data from SANSA. The imagery support a number of initiatives and enables various institutions to fulfil their constitutional mandates, including academic research, water resource management, and agriculture.

PRODUCTS AND SERVICES FOR SOCIETAL BENEFITS

Operations Phakisa

In support of the Oceans and Coasts Management Information System (OCIMS) of Operations Phakisa: The Oceans Economy SANSA has signed the contract for the provision of satellite-based Synthetic Aperture Radar (SAR) data. It is anticipated that the imagery will be acquired starting 2 May 2018. The satellite imagery will be fed into the OCIMS decision support tool. OCIMS will support a variety of oceans and coastal initiatives by providing information and decision support to key stakeholders for the day-to-day management of South Africa's oceans and coasts.

National Land Use and Land Cover Base Maps

The national land use and land cover base maps were successfully completed. The national products include human settlements, water bodies, forested land and National Vegetation Density (NVD) base layers. The national base layers are published on the SANSA Web Mapping Service.The NVD Base Layer (Figure 3) for 2017 has improvements over the Northern Cape Province based on stakeholder feedback.

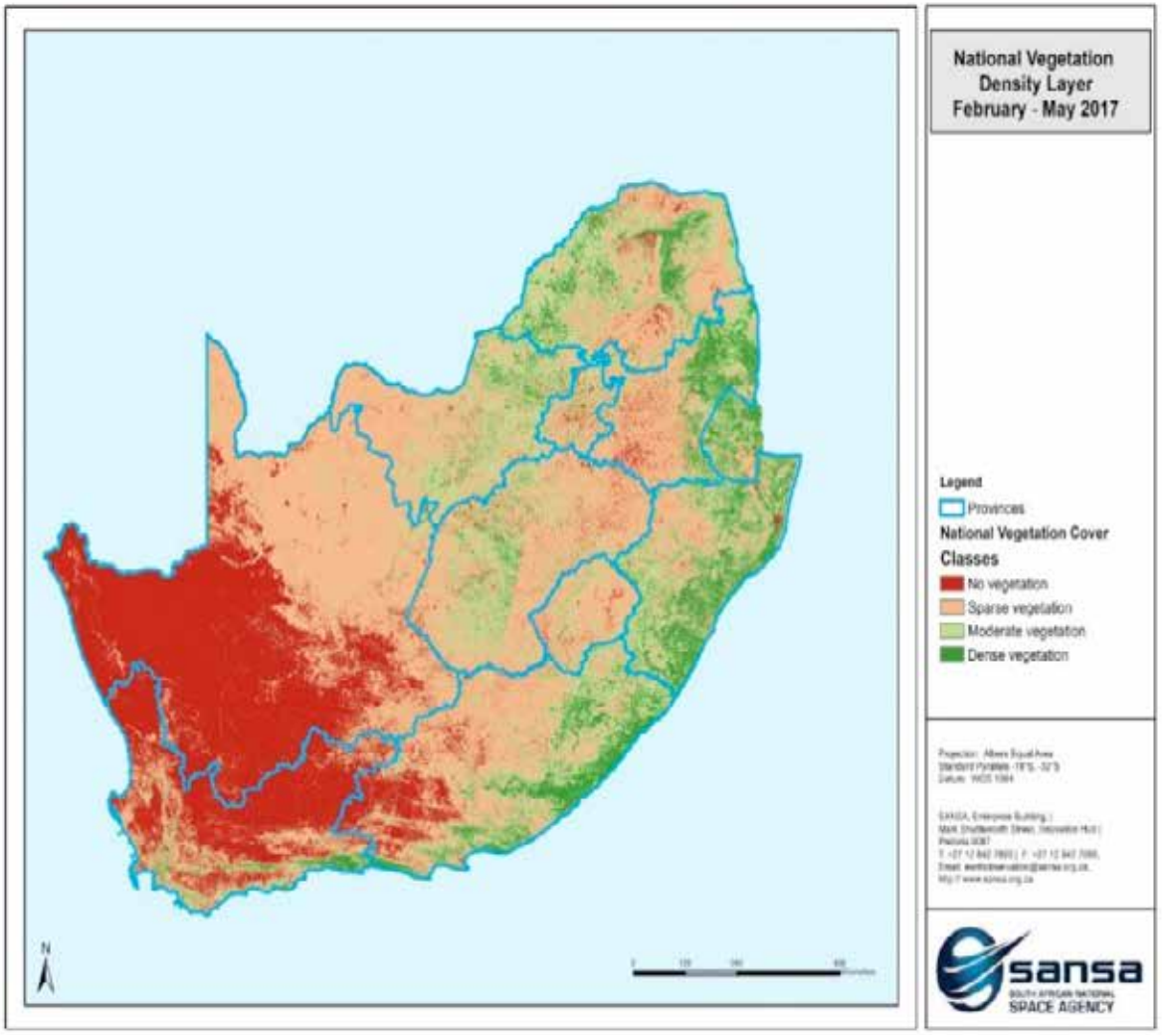


Figure 3: The national vegetation density map from February to May 2017, showing areas of no vegetation (red), sparse vegetarian (orange), moderate vegetation (light green) and dense vegetation (green)

The extraction of Water body Layers (WBL) for March-May 2017 and June- July 2017 from Landsat 8 data were completed and were appended with attribute information regarding dam names and water body size (in m2).

Water catchment information for irrigation monitoring was mapped using Landsat 8 data and includes data from Thabazimbi, Caledon, Hartebeespoort, Berbice and Pongola, Upington and Makhado to support the Department of Water and Sanitation's (DWS) Compliance and Monitoring requirement.

The national forest layer for 2017 was completed on quality assurance and implementation of the automated classification protocols. SANSA continued to support DAFF with forests layers and deforestation assessment in the country.

The automated classification of the 2016 National Human Settlements layer from SPOT 6 was completed with improvements acquired through addition of more mapping of spectral and textural parameters. Assessment of the results shows improvements compared to the 2015 results and the new methodology was presented at ISRSE conference held in Pretoria. Additional work on the human settlements project was focused on growth assessment of built up areas in major cities across the country between 2007 and 2014 (Figure 4). Special effort was also dedicated on developing a robust land consumption indicator from satellite imagery in support of the United Nation's SDGs.

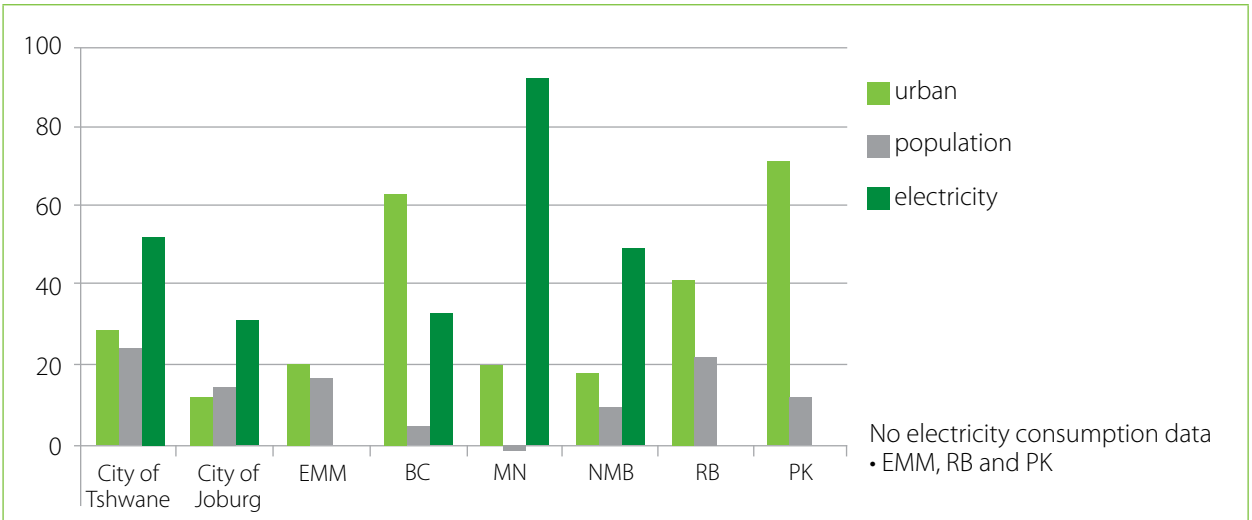


Figure 4: Comparison of 2007- 2014 urban growth results relative to population and electricity consumption rates

Results of the study indicate that secondary cities such as Polokwane and Rustenburg are experiencing higher urban expansion than metropolitan cities such as Johannesburg, Tshwane, Cape Town and Durban. The report on this change detection study will be shared with the relevant municipalities across the country. In addition, a new methodology to automatically detect human settlement data using Sentinel 2 satellite imagery was developed. The methodology was tested over Pretoria, Gaborone and Windhoek and the results successfully showed the spatial distribution of built-up and non-built-up areas.

The pilot project for the National Lotteries Commission (NLC) aimed at mapping and validating built-up infrastructure that is funded by the NLC for early childhood development progressed well. The mapping uses high resolution SPOT 6 imagery and geospatial analysis. This information will be used to support monitoring and evaluation of the funded projects by the Commission. In addition to the national base maps, a number of biophysical products for agriculture applications were produced and distributed to stakeholders that include Mobisurrence, SENWES and GFADA to support crop monitoring.

Crop Arable Land Fraction (CALF), Crop Anomalies, Canopy Chlorophyll Content, Canopy Water Content for the 2016/17 growing season were generated and distributed. GFADA is being provided with crop monitoring products on a weekly basis. The information is provided per field and used for precision farming.

Research and application development efforts were also focused on improving and automating mapping algorithms for the following human settlements, forest layer, and deployment of the Landsat 8 processor, development of a beta version geo-visualisation web portal for NEPAD and implementation of Horizon 2020, GMES and Africa Projects. The activities on the Horizon 2020 funded AfriCultuReS collaborative project focused on the consolidation of user requirements. The user requirements were collected from the Department of Agriculture Forestry and Fisheries, Agricultural Research Council and the South African Weather Services. The inventory of available data and field instruments within the consortium has also been completed.

Due diligence and rescoping of the GMES and Africa funded Wetland Monitoring and Assessment Service for Transboundary Basins in Southern Africa (WeMAST) and the Southern Africa Thema on Water and Natural Resources Service Application project was undertaken. The African Union Commission reduced the funding for the projects by 25-30%, requiring all the participants to scale down work packages in alignment with the abridged budgets.

The activities on the GEOGLAM RAPP collaborative project focused on modelling of rangeland biophysical variables and woody tree density and above ground grass biomass measurements were collected for calibration with satellite data.

SPOT National Mosaic

The acquisition of SPOT 6/7 images of a country wide winter season coverage has been completed and validated for quality and accuracy (see Image , below). The ortho-bundle product is complete and ready for distribution. The mosaicking process is about 75% complete.

Figure 5: Fused, pan-sharpened SPOT 6/7 scenes, now available for distribution

In addition to the winter season coverage, the final acquisition of data for the summer coverage, bringing total of acquired imagery to 706, was finalised. The image processing, preparing for distribution and producing the summer national mosaic has commenced.

Fire Investigation Reports

Thirty-two fire investigation reports were completed. These reports entail calculating the extent of the fires as well as determining the points of origin. The data used on a regular basis comes from MSG, MODIS and Landsat. SPOT (with a very limited archive) is used if no Landsat can be obtained This service is important in providing the evidence required in court during litigation and also in support of insurance claims that may arise due to the damage caused by fire outbreaks on farmland.

RESEARCH PRODUCTIVITY

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, and technical reports.

The Earth Observation Team contributed 160 points to the SANSA research productivity score. The score is a result of four technical reports written on studies undertaken during the course of the year, two international journal publications and one book chapter.

In addition, a policy brief on the how Earth Observation supports agriculture and food security was also completed.

SPACE AWARENESS AND HUMAN CAPITAL DEVELOPMENT

Science Engagement

Earth Observation directorate creates awareness of the role space plays in society nationally. This is delivered through several platforms suitable for engagement with particular segments of the public aligned to the target publics identified in the Science Engagement Strategy of the Department of Science and Technology.

10 362 youth from across the country, were directly engaged during this year through four main platforms of engagement; direct school visits, guided tours of SANSA facilities, career expo's and science festivals (see Figure below).

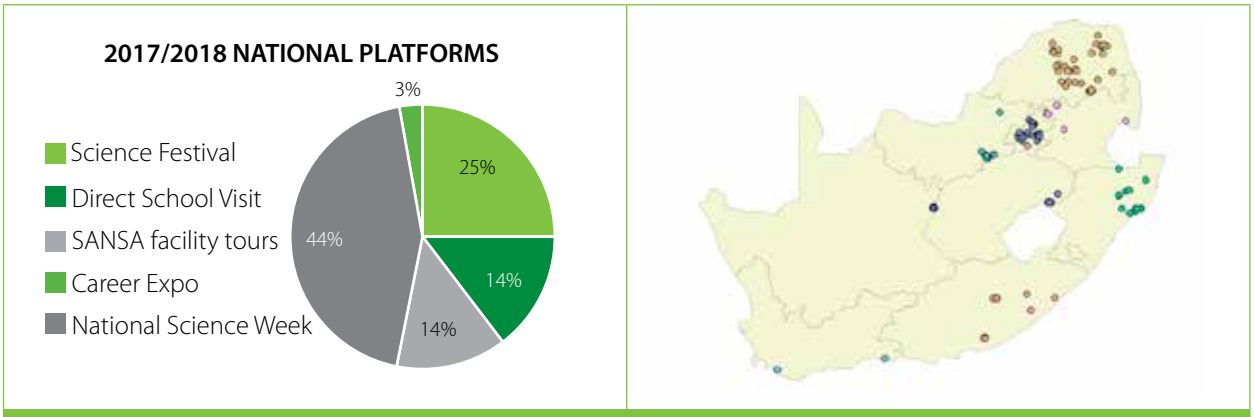


Figure 7: The above graphs illustrate the main platforms used to directly engage with the youth and the provincial distribution of engagement

Figure 6: Youth directly engaged through outreach activities

The major contributor by far is the National Science Week 2017, an initiative of the Department of Science & Technology aimed at celebrating science countrywide involving various stakeholders conducting science-based activities. SANSA secured the maximum grant value of R250 000 to facilitate the implementation of space science and technology activities that directly engaged with 4496 youth (44%).

The SANSA facilities provided the platform for engagement with over 1400 (14%) youth showcasing the country's investments in space infrastructure that provides the backbone for the interface with Earth-orbiting satellites. The visitors included international representatives of space entities that bore witness to the South African space industry's capacity to host globally significant events like the 37th International Symposium for Remote Sensing of the Environment (ISRSE).

Key visitor groups, included the M9 Development Lab, a partnership between the South African Radio Astronomy Observatory (SARAO) and National Radio Astronomy Observatory (NRAO of USA) aimed at the development of disruptive public participation program for multi-wavelength astronomy where high potential individuals from the South African science engagement community were identified to receive science engagement training.

SANSA conducted workshops for school-based learners at 4 science festivals hosted in four provinces, supported by the Department of Science & Technology, and directly engaged with more than 2500 youth (25%). The science festivals and career expos complement the direct school visits in supporting the gateway subjects' uptake and providing the gap-filling career information towards the creation of future participants in the knowledge economy. The key collaborator in the career expos which led to direct engagement with 300 youth is NRF SAASTA, with whom strategic discussions were held with the SANSA science advancement team in all four divisions to leverage off existing and future platforms jointly.

Outreach to the general public was further achieved through two television interviews, with Sunrise (eTV) interview conducted during Sci-Fest Africa science festival and the broadcasting of the GAU TV interview conducted in December 2017 titled "You are the sought after" profiling space physics.

HUMAN CAPITAL DEVELOPMENT

The collation of content for the Fundisa Disk has been completed. The content includes tutorials, sample imagery, as well as Open Source GIS and Remote Sensing software. The disks are currently being packaged, and distribution to universities countrywide will commence mid-April 2018.

A hands-on short course on introduction to remote sensing was presented to local government officials from the City of Johannesburg, Ekurhuleni and Rand West City Local Municipalities in March 2018.

INDUSTRY DEVELOPMENT

SANSA, in conjunction with Airbus and the Innovation Hub Company, ran an Open Innovation Challenge. The aim of the challenge was to stimulate, within industry, the innovative use of EO data, through the development of concepts for novel applications that could support the United Nations Sustainable Development Goals in water and agriculture. Sixteen shortlisted entrants were evaluated and an overall winner, Afriscope SA, was chosen. The winning entrant presented work on *"Using object recognition and machine learning algorithms to identify individual dwellings assisting in data capture and ultimately replacing costly laborious censuses."* All shortlisted entrants showcased at a *"World Café"* event held at the Tshismologong Incubator in Johannesburg. The *'World Café "* provided an opportunity for project teams to pitch their ideas to decision-makers. Apart from the overall winner, entrants were also provided

with prizes, which included incubation opportunities at the Innovation Hub and bespoke business development training. This innovation challenge was successful due to the partnership between SANSA, Airbus, The Innovation Hub Company, The Technological Innovation Agency and the Tshismologong precinct. Discussions leading up to the *"World Café"* resulted in an agreement that the partners will seek to refine the model in 2018.

SANSA held a successful Space for National Development Week at its Space Operations' facility in Hartebeesthoek. The week consisted of a number of engagement opportunities focusing on:

1. Recent development with respect to the South African Outer Space Bill, the Space Policy and Strategy, the African Space Policy and Strategy and the Pan African Space Sciences Institute.
2. A discussion with the stakeholders on the identification of decision maker information needs, opportunities for meeting these needs, associated infrastructure requirements and gaps and how the SANSA may respond in support of these information requirements.
3. A specific discussion with the EO community on requirements and the process leading up to the acquisition of high resolution data under a single licence multi user agreement.

The week culminated with an executive level dinner where executives from different government departments and the private sector were introduced to SANSA and were given an exposition of the benefit that space can bring to the development agenda.

SANSA successfully hosted the 37th International Symposium on Remote Sensing of Environment (ISRSE) in Tshwane from the 8-12 May 2017. This is the second time the conference has been hosted on the African continent. The theme of the symposium was: "Earth Observation for Development and Adaptation to a Changing World". A total of nine presentations from the Research and Applications Development (RAD) unit were presented at the conference. Out of the nine presentations, two were full papers. Conference statistics include:

- 539 delegates attending from 56 countries;
- 638 abstract submissions received;
- 91 sessions, 463 paper presentations and 80 posters;
- 27 exhibitors (Airbus Defence and Space; Asia Air Survey; Denel Spaceteq; DigitalGlobe; Esri South Africa; Firemaps.net – a brand by ZEBRIS; German Aerospace Centre (DLR); Hexagon Geospatial; MDA; NASA; PCI Geomatics; SANSA; SCS Aerospace Group; Southern Mapping and UrtheCast / Deimos Imaging) plus tables for Kwazinto Crafts and AARSE;
- 3 supporters (NASA, ESA and South African National Convention Bureau), 2 gold sponsors (Airbus Defence and Space and ESRI) and 2 silver sponsors (DigitalGlobe and MDA); and
- 284 Symposium Banquet attendees.

Figure 8: Minister Naledi Pandor delivered the opening message at the ISRSE 37 Symposium

PARTNERSHIPS AND COLLABORATIONS

IMPLEMENTATION OF MEMORANDUMS OF UNDERSTANDING (MoUs)

The partnership with Statistics South Africa focused on developing a methodology for monitoring the SDG indicator on ratio of land consumption rate to population growth rate at national level to assist Statistics South Africa in reporting progress towards the attainment of the SDG target 11. Five municipalities in three provinces, Limpopo (Polokwane), North West (Rustenburg), Gauteng (City of Tshwane, City of Johannesburg and Ekurhuleni), were selected for the pilot study.

Development of NEPAD geo-spatial web portal is currently underway following the NEPAD-SANSA MoU that was signed in 2017. The Africa focused online geo-visualisation platform will provide web mapping services that allow the dissemination of geo-spatial layers and products, support analysis of statistical and spatial data and reporting that supports the NEPAD initiatives, particularly development indicators aligned with Agenda 2063 and UN SDGs. The indicators will be classified in four impacts areas: Wealth Creation, Shared Prosperity, Transformative Capacity and Sustainable

Environment. A snapshot of the NEPAD Geospatial Web Portal is shown below.

Figure 9: Online geo-visualisation platform

National Collaborations

In partnership with the National Disaster Management Centre (NDMC), SANSA presented and distributed a flood vulnerability atlas with flood risk maps at settlement and household level at disaster awareness workshops held in Tshwane, Polokwane, Kenneth Kaunda, Klerksdorp, Matatiele and Bushbuckridge.

The M9 Development Lab provided a good platform to engage with the multi-wavelength astronomy science engagement community on ways to support the curriculum elements dealing with "Earth and Beyond" in a more collaborative manner. SANSA will continue the discussion with HartRAO to pilot the first training for the Tshwane South District of the Department of Basic Education during quarter 1 of the 2018/2019 financial year. The same discussion has been held with NRF SAASTA Science Education unit to support educators nationwide.

Africa Engagement

The second edition of the International Space Forum at Ministerial level (ISF) – the African chapter was held in Nairobi, Kenya in February 2018. The forum brought together African ministers, academics and Space agencies to encourage a global discussion on capacity building, the role of space in enhancing environmental sustainability and promoting of space partnerships. The SANSA CEO, in his capacity as the International Astronautical Federation (IAF) Vice President for Developing Countries and Emerging Nations provided a keynote speech on capacity building. The IAF also provided an opportunity for the SANSA delegation to foster new partnerships and strengthen existing ones. A key highlight was the broad agreement from attending African Space Institutions to forge ahead with the Committee of African Space Institutions (CASI). The latter is an initiative to promote cooperation between African Space Institutions and to develop continental level cooperation projects in Earth observation, space science, space operations, navigation and positioning and space communications.

SANSA scientists participated in the UNGGIM-Africa meeting, looking at geospatial standards, and the AfricaGIS conference held in Addis Ababa from the 19th to the 24th November 2017. AfricaGIS is the premier conference and exhibition focusing on geo-information science and technologies in Africa. The focus of the conference was to provide a platform for the GeoSpatial community to interact, share knowledge on new technological developments and applications that meet and address the needs and challenges of the African continent.

SANSA scientists attended the GMES and Africa due diligence and project workshops held in Botswana, Namibia and Ghana in January and February 2018.

International Cooperation

Work on the human settlements project was presented at the World Forum on Natural Capital that was held in Edinburgh, 27-28 November 2017. The purpose of the forum was to foster a better understanding of the impact on the natural world by showcasing initiatives, sharing best practices, and sharing new ideas on protecting, measuring and rebuilding the natural ecosystem. The forum was attended by over 700 delegates from more than 60 countries.

SANSA participated in the International Space Education Board (ISEB) teleconference aimed at planning the ISEB IAC 2018 Program to be held in Bremen, Germany. Following the resolution taken in Adelaide for the mid-year face-to-face meeting of the Heads of Education, members reiterated their constraints for an on-site participation, mainly due to the budgetary planning or restrictions and travel limitations.

SANSA scientists participated in the 31st Committee of Earth Observation Satellite (CEOS) Plenary that was held in Rapid City, South Dakota, USA between the 18th and 20th October 2017, see figure 17, below. The objective of the Plenary was to evaluate progress and provide direction and endorsement for the CEOS Working Groups activities. Special focus was paid on the contribution of earth observation technology to the United Nations Sustainable Development Goals (SDGs), thematic acquisition strategies, Future Data Architectures (FDA), Observations for agriculture (GEOGLAM) and capacity development. At the Plenary, SANSA passed on the chairing of the Working Group on Capacity Development (WGCapD) to ISRO.

PROGRAMME 3: SPACE SCIENCE

PURPOSE

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

STRATEGIC FOCUS

GOAL 1: ADDRESS SOUTH AFRICA'S CHALLENGES THROUGH SPACE SERVICES AND PRODUCTS:

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

GOAL 2: LEAD HIGH-IMPACT COLLABORATIVE R&D ON A NATIONAL SCALE:

- Space science research;
- Geo-space observational network; and
- Data management and distribution.

GOAL 3: DEVELOP NATIONAL HUMAN CAPACITY AND ENSURE TRANSFORMATION:

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

GOAL 5: DEVELOP ACTIVE GLOBAL PARTNERSHIPS:

- Development and servicing of national and international partnerships; and
- Joint projects with external partners.

GOAL 7: TRANSFORM SANSA INTO A HIGH PERFORMANCE AGENCY:

- Ensuring equity and transformation; and
- High-level institutional performance.

SPACE SCIENCE PROGRAMME PERFORMANCE OUTPUTS 2017/18

Space Science Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Variance & Comment**
Goal 1: Address South Africa's challenges through space services and products	S1.1 Lead and facilitate the creation of high-impact products and services to address society's needs and challenges	M1.1 The number of national high-impact products and services	4. Space weather products and services	All Space Weather support provided; All requested services delivered. User engagement and impact report produced.	Target Achieved
			HF Propagation Prediction Services		
			Space Weather Bulletins & Alerts		
			Space Weather Course		
			Space Weather Support Tools		
			5. Magnetic Technology products and services	169 Calibrated compasses; two magnetic awareness courses; 10 SAAF courses provided; Magnetic Navigation ground support provided. User engagement and impact report produced	Target Achieved
			Compass Calibrations		
			Magnetic Navigation Ground Support Services		
			Magnetic Field Model Maps		
			Magnetic Sensor Sourcing		
			Aircraft Swing Courses		
	S1.2 Provide government with effective policy or decision tools and support	M1.2 The number of government decision or policy support tools	A policy advisory brief covering the safety and security applications from a magnetically clean environment	Policy brief complete and approved	Target achieved

Space Science Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Variance & Comment**
Goal 2: Lead high-impact collaborative R&D on a national scale	S2.1 Increase the national space research output	M2.1 The national research productivity score for space supported R&D (This productivity score is based on a function of research funding sourced + publications (journals, books, reports, proceedings) + students graduated + research rating status)	960	886	Publications were lower in 2017/18 than in previous years due to reduction in available funding, and long lead times of journals. Funding was also lower which impacted the score, and most completed students will only graduate in 2018/19
Goal 3: Develop national human capacity and ensure transformation	S3.1. Increase youth awareness of science	M3.1 The number of youth directly engaged through science awareness & outreach activities (This excludes arms-length engagement with the youth e.g. a visit to one of SANSA's exhibition stands)	4800	7679	Several successful interventions resulted in exceeding targets
	S3.2 Support students with a transformation agenda	M3.2 The number proportion of supported PDI students for formalized training (This excludes short courses and focuses on students that are registered for some formal training for a degree, diploma, or certificate within the South African National Qualification Framework)	PDI Target: 28	29	Student numbers fluctuate depending on available funding and progress.
			Total Students: 35	37	
			PDI Proportion: 80%	78%	

Space Science Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Variance & Comment**
Goal 5: Develop active global partnerships	S5.1. Leverage a significant benefit for the space programme through global partnerships	M5.1 The equivalent revenue generated through partnerships as a proportion of the SS non-commercial operating revenue	Stakeholder Income: R840 000	R 1.2 million	Equipment donation for a campaign added to the value in Q4
			Non-Commercial Revenue: R 28 million	R 34 million	
			Proportion: 3%	4%	
Goal 7: Transform SANSA into a high performance Agency	S7.1. Ensure that SANSA has been formalised for high performance	M7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades	PDI employees (D-F grades): 15	10	This can only change when a new position is available - 1 resignation and 1 retiree, plus addition of new researcher resulted in change
			Total employees (D-F grades): 25	18	
			Proportion: 60%	56%	
		M.7.3 Proportional (1%) of investment into staff training & development against operating expenditure	T&D Expenditure: R358 470	R 236 312.23	Training and development is usually expensed mostly in quarter 4 and is dependent on available funding and suitable timing.
			Total Operating expenditure	R 34.9 million	
			Proportion: 1%	0.7%	

Table 6: Space Science Program Performance

KEY ACTIVITIES AND IMPACTS

SPACE SCIENCE RESEARCH

SIGHTINGS IN SPACE SCIENCE

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. During 2017/2018, the Space Science programme contributed 886 points towards SANSA's research productivity score. This contribution included nineteen papers published in high impact internationally reviewed research journals, equating to an average of 2.7 papers per permanent researcher per annum within the Space Science programme. This is an indication of the contribution that SANSA is making to the knowledge economy as well as the international recognition that SANSA researchers claim.

SANSA researchers in collaboration with researchers at the GFZ German Research Centre for Geosciences in Potsdam, Germany, analysed geomagnetic Y-component data from five magnetic observatories located in Southern Africa at Hermanus, Hartebeesthoek, and Tsumeb as well as the adjacent Atlantic Ocean region at St Helena and Tristan Da Cunha to identify abrupt secular variation changes on time scales of less than one year. The results obtained revealed that this 2015 magnetic event took place with varying amplitudes at

the different magnetic observatories. In the process the respective observatories in the region exhibited strong individual characteristics. This is important because it is the first detailed description of the 2015 magnetic event in this area, and improves the understanding of the behaviour of Earth's magnetic field which is essential to protecting life and technology on Earth.

SANSA researchers investigated the possibilities of developing a mathematical expression relating the drift velocity obtained from magnetometer and Communications and Navigation Outage Forecasting System satellite observations over the low/equatorial regions. This force which is usually known as the vertical ExB drift moves ionospheric plasma vertically and largely drives the low latitude electrodynamical processes which lead to development of ionospheric irregularities that influence navigation and positioning applications. This research is important because it provides a low cost platform for expanding the vertical ExB drift database over longitude sectors that are devoid of radar instrumentation. The developed technique uses inexpensive magnetometer observations combined with satellite data to generate continuous ExB drift data over an extended period of time. It is now possible to develop space weather models that are accurate at all longitude sectors over low/equatorial latitude regions.

SANSA researchers are investigating the use of magnetic field and solar wind particle data from the ACE satellite to perform a spectral analysis of the solar wind magnetic field observations. These oxygen and carbon charge state ratios are a proxy for the electron temperature in the solar corona while the solar wind elemental composition abundances are related to processes in the source region of the solar wind. The findings revealed that the sectorial solar magnetic field was dominating during the minimum 23-24, indicating an unusual configuration of the solar dynamo. This is important because these conditions in the heliosphere have a profound influence on geomagnetic activity as measured and observed on Earth.

SANSA researchers are investigating the possibility of determining plasmaspheric electron content for a network of African GPS receivers located along the same longitude. The aim is to separate ionospheric and plasmaspheric electron content in order to find an explanation for ionospheric features with minimal reference to other sources. This is important as it provides a solid base on which to characterise the upper atmosphere and improve models that are utilised for space weather applications.

SAFETY AND SECURITY APPLICATIONS FROM SPACE SCIENCE

SANSA continues to contribute to the safety and security of the nation through the High Frequency (HF) service that is provided to the South African National Defence Force (SANDF). This service predicts HF propagation paths for the SANDF that allows users to prepare HF communication plans well in advance of operations. SANSA notifies the SANDF via several communication channels and adjusts the propagation path prediction when adverse space weather has been detected. This service is important because it allows the SANDF to prepare for operations and communicate optimally with the troops and other military personnel on the ground. SANSA recently provided refresher training for the South African Navy on HF predictions and the optimum use of the space weather information provided.

SANSA provided eight SANDF installations of HF prediction software in several locations across the country. SANSA assists the SANDF users with the software installation and training which allows the users to better manage their HF communications planning. In addition, SANSA has developed a user-defined HF prediction demonstrator software, which is being tailored for SANDF users. A demonstration of the software to the Army and Airforce resulted in the request for a 90 day evaluation version to assess the suitability within the operations environment. This is one of the ways in which SANSA is demonstrating some value-add solutions to HF communications planning, and assisting users with enhanced utilisation of the provided space weather information.

SANSA was recently requested by the Hermanus detective branch of the South African Police Services (SAPS) for support to locate an AK47 rifle that was thought to be buried in the dunes at Sandbaai, a suburb of Hermanus. The SAPS tried without success to locate the firearm using excavation methods. SANSA personnel used a high accuracy proton-precession gradiometer, an instrument that measures the vertical gradient of the Earth's magnetic field at a specific position, to indicate the presence of magnetic items

underground. This instrument and the technique are vital when seeking magnetic objects such as iron, cobalt and nickel. When searching for ammunition, which is made mostly from copper and lead and thus non-magnetic metals, ordinary metal detectors, using the search coil induction principle, could also be used to assist. Although the firearm was not found, both instruments indicated three "hits" at the same places indicating possible underground anomalies – one of them was an old rusted knife. The SANSA team are exploring how this technology may be of use to SAPS in future investigations.

During the past two years SANSA has been supporting SA Navy commanders who are participating in a maritime compass adjuster correspondence course presented by Haigh Maritime Services in Australia – the only company in the Southern Hemisphere presenting such a course. SANSA has developed a local supporting mentoring programme to assist the SA Navy personnel with this course. There are very few naval and civilian compass adjuster still active in Southern Africa, however, this is still an activity required by local and international maritime safety laws. Recently SANSA was also contacted by the South African Maritime Safety Authority (SAMSA) requesting participation in SANSA's mentoring programme as SAMSA personnel are also enrolled on the Australian course and need at home support. Therefore, SANSA anticipates continuation of this support service to the maritime sector.

Figure 10: SANSA supports SA Navy Commanders and other defence personnel in expanding their knowledge base

SANSA maintains and operates a magnetically clean facility within its Hermanus campus. During 2017/18 SANSA produced a policy brief entitled "Safety and Security Applications from a Magnetically Clean Environment". This policy brief is aimed at creating awareness of the value that an established and well maintained magnetically clean environment, operated by the relevant experts, can have for safety and security applications within a country such as South Africa. The main recommendation from this policy brief is that the South African government include the protection and preservation of the magnetically clean environment located within the town of Hermanus into the legislative framework. An additional six recommendations are made for the utilisation and maintenance of this unique infrastructure and capability. Although this policy brief is mostly focussed on the benefits of a magnetically clean environment to the safety and security sector, it is also made clear that there are several other areas in which this unique environment plays an important

role. These areas include applications for aerospace and maritime sectors (such as calibration of specialised coil systems, and corrosion identification), magnetic data availability for space weather applications, space industry applications and the prediction of hazards such as earthquakes.

IMPACT

The Earth's magnetic field is a key factor for accurate navigation and long-range weapons delivery, and is a dynamic, changing phenomenon. The impact of this natural phenomenon is that annual updates of the changing magnetic field as well as geomagnetic field models are required in order to ensure the accuracy of maps, and positioning information. The Earth's magnetic field is also an important influencing factor on aircraft landing compasses, and the navigation systems of dynamic platforms, such as unmanned aerial vehicles. Navy vessels at sea have specific magnetic signatures that provide a unique identification tag for each vessel, and knowledge of magnetism assists in protecting these vessels from harm.

A WINDOW INTO GEOSPACE

SANSA is a key player in the South African National Antarctic Programme (SANAP) and operates 80% of the shore based equipment located at the South African base in Antarctica as well as equipment at the Marion Island base. Antarctica is the ideal location for the collection of data that is utilised for space weather research and operations, as the proximity to the South Pole allows for a view of the space environment along the magnetic field lines. SANSA's participation in these programmes is made possible through the logistical support of the Department of Environmental Affairs (DEA) and the financial support of the National Research Foundation (NRF).

The SA Agulhas II research vessel departed for Antarctica in December and returned in February 2018. The SANSA team comprised of two new overwintering engineers and three takeover engineers. The main aim of the relief voyage was to perform preventative and corrective maintenance on all SANSA instrumentation located in and around the South African base. The SANSA team also played a significant role in assisting the field teams, who were at the end of their current grant cycle, to remove their instrumentation. The relief voyage was very successful with all planned activities carried out, and a SANSA delegation was waiting at the Cape Town harbour to welcome the team safely home.

IMPACT

Antarctica holds a fascination for many people and has done for centuries. It is not just a hostile environment in which research teams study obscure phenomena. It is a "barometer" against which the rate and effects of climate change and global warming can be measured. This is why most developed and some developing countries have bases in Antarctica, and why it is vital for scientists to continue their research despite having to cope with the challenges of working in the coldest, windiest, driest, least populated and most remote part of the world. South Africa is the only African country to have a permanent base in Antarctica, and is one of the original signatories of the Antarctic Treaty.

The Marion Island relief voyage took place from April - May 2017. The SANSA team included three engineers, the relief voyage engineer, the 2016 overwinter returning engineer, and the new 2017 overwinter engineer. The take-over tasks included routine maintenance and training as well as upgrades to the VLF systems. The 2017 takeover also saw the commencement of a collaboration between UKZN and SANSA on a radio astronomy project, in which SANSA will provide winter support for the FPGA based receiver, the dual antenna system and manage the collection and processing of data. The relief voyage went very well and all the planned tasks were accomplished within the intended timeframes. SANSA also provided assistance to the DEA as the SANSA 2016 Engineer doubled as the DEA Communications Engineer on Marion Island for the last year.

Figure 11: SANSA Team Members with the returning Antarctic Team in February 2018

AFRICAN INSTRUMENTATION NETWORK – MEASURING SPACE FROM THE GROUND

SANSA engineers and technicians have commenced with the Geomagnetic Observatory Upgrade project. This project involves the upgrading of SANSA's four geomagnetic observatories to state of the art standard equipment that is modernised for remote locations. This is necessary as these stations provide the foundation data for most of SANSA's space science related products and services, and in order to maintain the required InterMAGNET accreditation. The first upgrade at the Tsumeb, Namibia observatory is complete with functional instrumentation. A new building has been constructed to house the one-second fluxgate magnetometer, and the existing instrumentation and loggers have been upgraded with a standardised set of hardware in order to make maintenance, repairs and replacement easier and more efficient. The upgraded station is currently functioning well and a good improvement has been seen in the quality of the data.

The next geomagnetic observatory upgrade will be at the Hartebeesthoek location - the instrumentation has been procured and tested in Hermanus in preparation for this upgrade. Parallel to these upgrades, development work has also been performed on thermally stabilised housings for the fluxgate sensors that will neutralise any external temperature variations experienced by the sensors and electronics that lead to shifting biases in the data. Once complete it is envisaged that these housings will be deployed to each station.

LEADING THE WAY ON A GLOBA L PLATFORM

SANSA researchers participated in a successful Horizon 2010 project which commenced at the end of 2017. The project is being led by the University of Athens in Greece, and is entitled "Warning and Mitigation Technologies for Travelling Ionospheric Disturbances Effects (TechTIDE)". There are 13 international partners in the project, and SANSA's main contribution will be through unique data coverage and ionospheric expertise. The outcome of the project will significantly benefit the product suite for SANSA's Space Weather Applications.

The SANSA space weather team attended the 14th European Space Weather Workshop (ESWW) in Oostend, Belgium. This is an important event on the space weather calendar as it brings together space weather researchers and forecasters from across the globe who discuss latest research, trends, and international requirements for space weather. SANSA presented an invited presentation entitled "Space weather event impacts on South African technology" which was under the session Space Weather Policy, Key Drivers, and prime Opportunities. In addition, for the first time SANSA was invited to present a space weather live forecast during ESWW. The live forecast was co-presented with the UK Met Office who covered the broad forecast on the solar

activity while SANSA provided the detailed forecast on the terrestrial impact of space weather on that day.

SANSA has just concluded delivery on a two-year contract to provide space weather-related data in near-real time to Eskom. This was the first contract of this kind with the power utility, and resulted from several year's work in education and research on the impacts of space weather on the power grid. Real-time monitoring of space weather is important to the power utility as intense geomagnetic storms can cause damage to power generation and distribution infrastructure.

SANSA hosted a delegation from the Ethiopian Space Science Technical Institute (ESSTI), who visited SANSA as part of a joint space science and technology workshop hosted by the DST. The delegation spent some time at the SANSA Hermanus facility and identified various areas for collaboration including space weather impact, characterisation of the ionosphere and numerical modelling of the atmosphere. SANSA has assisted with the supervision of various Ethiopian students in the past, and will have two Ethiopian students graduating in 2018. Space science in Ethiopia is expanding significantly, and the ESSTI is a strategic African partner to SANSA, therefore, this visit was an important opportunity to discuss the growth of this partnership. An immediate outcome from this visit was a request for training and information sharing around the processes for establishing space weather capability.

Figure 12: The Ethiopian Space Science Technical Institute (ESSTI) visited SANSA Hermanus in 2017

SANSA and the University of Michigan in the USA successfully submitted a three year proposal to the National Science Foundation (NSF) in the USA in 2015 to support six University of Michigan (UM) graduate students per annum to spend approximately eight weeks at SANSA. The six students will each undertake a project in either space physics or engineering, under the supervision of a SANSA mentor based at the Hermanus facility. SANSA hosted the second group of UM students in May – July 2017. The UM students are each assigned to a SANSA mentor and have a project to undertake during their stay. In addition, they joined the SANSA team in attending the South African Institute of Physics conference where they presented on the research projects undertaken while at SANSA. The students also participated in the annual International Space Weather Camp hosted by SANSA in Hermanus in July 2017. This is a beneficial global partnership as the South African students are exposed to international students while also sharing knowledge and capabilities in research projects that benefits SANSA's focus areas.

UTILISING SPACE TO CREATE EXCITEMENT IN SCIENCE AND TECHNOLOGY

SANSA hosted Holiday Programmes at the SANSA Science Centre in Hermanus during the July and December school holidays. A total of 128 learners ranging in age from 6 to 12 were reached during the two programmes in 2017. The programme in 2017 mainly utilised robotics as a source of inspiration with the Mars exploration mission providing the context, and LEGO mindstorm robots built by the young learners as a practical hands on activity. The SANSA holiday programme has become a popular item on the calendar and places in the programme are usually booked up within 24 hours of the first announcement.

Figure 13: SANSA's Holiday Programmes are very popular and the building of robots is an exciting activity

SANSA hosted a successful National Science Week during August 2017 with the SANSA Science Centre providing many exciting activities for learners of all ages. A new developed activity entitled "Weather in Space" was utilised as a learning tool to expose grade 7 learners from local schools as well as the SANSA Science Club learners to the magnetism of sunspots as observed in the SANSA Space Weather Center and to the useful and practical nature of magnetic coils. A highlight of National Science Week 2017 in the Western Cape was the SANSA Open Day. Over 500 members of the public visited the facility in Hermanus and participated in tours and hands on activities for learners which included building a Sun & Earth model and using electric motors to build robots. The Open Day included a public lecture which was presented by the Chief Scientist who discussed the excitement and thrill of uncovering the mysteries of Sprites in the atmosphere. Visitors also had the opportunity to engage with researchers and ask science related questions during "Speed Chat a Scientist" sessions. The local community radio station broadcast from SANSA on the day and contributed significantly to the "Science is Fun" atmosphere. A number of radio interviews were conducted with SANSA researchers and engineers on the importance of space science and technology as well as exciting career opportunities available to the youth.

National Science Week (NSW) is a DST initiative that involves stakeholders and role players in science-related activities to showcase the benefits of science to society. The theme for NSW 2017 was "Advancing Science Tourism" and took place from 5 –12 August.

PROGRAMME 4: SPACE OPERATIONS

PURPOSE

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

STRATEGIC FOCUS

GOAL 4: ENHANCE THE COMPETITIVENESS OF THE SOUTH AFRICAN SPACE INDUSTRY:

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

GOAL 3: DEVELOP NATIONAL HUMAN CAPACITY AND ENSURE TRANSFORMATION:

- Science outreach and awareness; and
- Intern training.

GOAL 7: TRANSFORM SANSA INTO A HIGH PERFORMANCE AGENCY:

- Ensuring equity and transformation; and
- High-level institutional performance.

SPACE OPERATIONS PROGRAMME PERFORMANCE OUTPUTS 2017/18

Space Operations Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Comment on Variances**
Goal 3: Develop national human capacity and ensure transformation	S3.1. Increase youth awareness of science	M3.1 The number of youth directly engaged through science awareness & outreach activities (This excludes arms-length engagement with the youth e.g. a visit to one of SANSA's exhibition stands)	2400	5205	Two major science festivals contributed to exceeding the target.
	S3.2 Support students with a transformation agenda	M3.2 The number of supported PDI students for formalised training (This excludes short courses and focuses on students that are registered for some formal training for a degree, diploma, a or certificate within the South African National Qualification Framework)	PDI Target: 8	8	Nine staff members registered for formal qualifications paid for by SANSA. Eight are PDI. KPI excludes staff therefore the actual reported on this KPI is not counted
			Total Students: 10	9	
			PDI Proportion: 80%	88%	

Space Operations Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Comment on Variances**
Goal 4: Enhance the competitiveness of the South African space industry	S4.1. Generate greater benefit for the space programme through space operations activities	M4.1.1: Successful satellite pass monitoring rate for Earth Observation	Target Passes: 4412	4412	Target achieved
			Total/Actual Requested Passes: 4500	4500	
			Proportion: 98%	98%	
		M4.1.2: Total commercial income generated per year from space operations activities.	R44 million	R86 million	The last quarter performance exceeded all expectations. mainly due to extra and unpredicted launches
		M4.1.3: The proportion of space operations commercial income invested in other SANSA programmes	Investment: R2.2 million	R3 million	The last quarter performance exceeded all expectations due mainly to extra and unpredicted launches
			Commercial International Income: R44 million	R60 million	
			Proportion: 5%	5%	
Goal 7: Transform SANSA into a high performance Agency	S7.2. Ensure that SANSA has been optimised for high performance	M7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades	PDI employees (D-F grades): 8	8	Target achieved
			Total employees (D-F grades): 13	13	
			Proportion: 60%	60	
		M.7.3 1% of investment into staff training & development against operating expenditure.	Training and Development Expenditure: R440 840	R1 million	The target was exceeded due to the growth in operational expenditure. In line with this, training had to take priority to ensure talent growth with operational growth
			Total Operating Expenditure : R44 million	R 72.4 million	
			Proportion: 1%	1.39%	

Table 7: Space Operations Program Performance

KEY ACTIVITIES AND IMPACTS

HIGHLIGHTS

This was a challenging financial year due to the increased workload in the international TT&C market as well as completion of in-house projects to increase productivity and long term sustainability.

SANSA provided a total of 47 spacecraft interactions or supports for the financial year 2017/18. The table below indicates the completed schedule and the interactions that were completed within this period:

TT&C Support 2017-2018	
TOSS Supports	19
IOT Supports	1
Launch Supports	15
Normal supports	7
ESVA certifications	5

In the light of this extensive support report two specific missions need to be elevated and these are SES-14 & Al-Yay3 and JPSS.

In the case of SES-14 and AL-Yay 3, both these spacecraft were released into the wrong orbit. This, in turn, created an emergency for the owners as well as the launch supplier. SANSA was then requested to do emergency supports for both spacecraft simultaneously. This was requested for an indefinite period of time until both spacecraft could be manoeuvred into their correct respective orbits.

NOAA's Joint Polar Satellite System (JPSS) provides global observations that serve as the backbone of both short- and long-term weather forecasts, including those that help us predict and prepare for severe weather events. The five satellites scheduled in the fleet were the currently-flying NOAA/NASA Suomi National Polar-orbiting Partnership (Suomi NPP) satellite, JPSS-1 or NOAA-20, as it will be known once on-orbit, JPSS-2, JPSS-3 and JPSS-4.

Each satellite carries five state-of-the-art instruments, including the Advanced Technology Microwave Sounder (ATMS), the Cross-Track Infrared Sounder (CrIS), the Visible Infrared Imaging Radiometer Suite (VIIRS), the Ozone Mapping and Profiler Suite (OMPS) and an instrument to measure the Earth's energy budget.

JPSS satellites circle the Earth from pole-to-pole and cross the equator about 14 times daily in the afternoon to provide full global coverage twice a day. In doing so, they provide the majority of data that informs numerical weather forecasting in the U.S. and deliver critical observations during severe weather events like hurricanes, tornadoes and blizzards.

Beyond forecasting, JPSS satellites also play a critical role in detecting and monitoring environmental hazards, such as droughts, forest fires, poor air quality and harmful coastal waters observations on a continuous basis until 2038.

NOAA, an agency within the U.S. Department of Commerce, works in partnership with NASA on all JPSS missions, ensuring a continuous series of global weather data to secure a more "Weather-Ready" Nation. SANSA is proud to build the reputation of the South African space industry with their role in such significant launches.

DARK FIBRE FOR IMPROVED TELECOMS

SANSA completed the installation of an end-to-end dark fibre solution between the Hartebeeshoek site and Teraco Data Environments, which will be used for the provisioning of a multiple wavelength transport network of at least 100Gbps per wavelength. Teraco has three state-of-the-art colocation data centres based in Cape Town, Durban and Johannesburg.

The strategy behind this project was to enable better communications and redundancy to all local and international stakeholders enabling SANSA to provide a more efficient service worldwide.

AVANTI ANTENNA PROJECT

The first site establishment of a Teleport Station has been completed as per the requirement within the Space Operations strategy. The civil works was successfully completed on time, scope and budget. The installation of the related infrastructure inside the RF-Shelter (Power, Cooling, Building Monitoring, Fire Suppression etc.) was completed.

The antenna assembly and related tests have been completed. Some of the training has been given to the SANSA technical and operations teams. SANSA is pleased to have fulfilled this first Teleport project as this will ensure new ventures in this field of communication.

HBK-07 KU ANTENNA UPGRADE

In 2017 SANSA was contracted to deliver Transfer-orbit support services (TOSS) for the QZS - 2 satellite for Launch plus one day. To successfully carry out this task, SANSA had to utilise the HBK-07 KU antenna, that was originally installed in 1998, with its control system literally at the end of its operational life-span and without any support from manufacturers.

The high customer demand of the KU band antenna necessitated an urgent system upgrade which under normal circumstances would take a few months. Taking into account the technical requirements and a very strict installation period in which the upgrade and commissioning had to be done, the project was finalised within one month and in time for the TOSS.

SANSA WINS BID TO HOST 2020 SPACE OPERATIONS CONFERENCE

SANSA won the bid to host the 16th International Space Operations Conference in 2020 in South Africa for the first time. This prestigious event has been held biennially the world over since 1990. The Space Ops conferences foster technical and management conversations on all aspects of space mission operations. It attracts technologists, scientists and managers from the international space mission operations and ground systems community, as well as representatives from global and local space agencies, commercial operators, academic and research institutions and industry.

PROGRAMME 5: SPACE ENGINEERING

PURPOSE

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

STRATEGIC FOCUS

GOAL 3: DEVELOP NATIONAL HUMAN CAPACITY AND ENSURE TRANSFORMATION:

- Student and intern training; and
- Student funding.

GOAL 4: ENHANCE THE COMPETITIVENESS OF THE SOUTH AFRICAN SPACE INDUSTRY:

- EO-Sat1 development;
- Industry development;
- Innovation management;
- Facilities development; and
- Space programme management.

GOAL 7: TRANSFORM SANSA INTO A HIGH PERFORMANCE AGENCY:

- Ensuring equity and transformation; and
- High-level institutional performance.

SPACE ENGINEERING PROGRAMME PERFORMANCE OUTPUTS 2017/18

Space Engineering Programme			Annual		
Strategic Goal	**Strategic Objective**	**Key Performance Indicator/Measure**	**Annual Target**	**Annual Actual**	**Comment and Variances**
Goal 3: Develop national human capacity and ensure transformation	S3.2 Support students with a transformation agenda	M3.2 The number of supported PDI students for formalised training (This excludes short courses and focuses on students that are registered for some formal training for a degree, diploma, a or certificate within the South African National Qualification Framework)	PDI Target: 8	10	Intake of 2 of new students in Q4. PDI proportion target not met.
			Total Students: 10	18	
			PDI Proportion: 80%	55%	
Goal 4: Enhance the competitiveness of the South African space industry	S4.2 Grow the national space industry	M4.2.1 The number of direct jobs supported externally through SANSA programme contracting	T4.2.1 A total of 55 direct jobs supported per year externally through SANSA programme contracting	62	Additional jobs created on the CPUT CubeSat Programme
		M4.2.2 The achievement of key project milestones in the EO-Sat1 development	Preliminary Design Review (PDR) completed for the Space System in preparation for Critical Design review in 2018/19 (Progressive Quantitative target)	Completed	Target achieved

Space Engineering Programme			Annual		
Strategic Goal	Strategic Objective	Key Performance Indicator/Measure	Annual Target	Annual Actual	Comment and Variances
		M4.2.3 The total contract expenditure to SMEs for core space projects	R13 million	R11.5 million	Limited funds to executed the entire project
		M4.2.4 The total contract expenditure to the broad space related industry for core space projects	R65 million	R78 million	Target exceeded as contracting for EO–Sat and ZACube.
Goal 7: Transform SANSA into a high performance Agency	S7.2. Ensure that SANSA has been optimised for high performance	M7.2 Proportional (%) representation of permanent staff from designated groups in the D to F grades	PDI employees (D-F grades): 8	5	1 employee resigned in Q3 and the vacancy was not filled.
			Total employees (D-F grades): 13	6	
			Proportion: 60%	80%	
		M.7.3 1% of investment into staff training & development against operating expenditure.	Training and Development Expenditure: R134 310	R66 180	Training in International Project Management at NASA
			Total Operating Expenditure: R13 million	0	Total reported under the administration programme
			Proportion: 1%	0.51%	

Table 8: Space Engineering Programme Performance

KEY ACTIVITIES AND IMPACTS

EO-SAT1 SATELLITE DEVELOPMENT

EO-Sat1 will be the first operational Earth Observation mission for the South African Government. The satellite serves as the South African contribution to the African Resource Management Constellation (ARMC). It was designed to observe the Earth's surface in various spectral ranges and to deliver reliable and accurate data in support of critical applications, such as the monitoring of agriculture and water bodies, as well as to deliver sharp images that can be exploited by applications relying on an analysis of the geospatial structure of the environment.

The System Level (Level 6) Preliminary Design Review (PDR), a significant milestone of the project, was successfully completed in March 2018. The formal event was attended by a number of external reviewers from the University of Stellenbosch, Wits University and from the space industry. Reviewers agreed that the work reviewed was of the highest quality standards in all areas, and that the programme should continue into the next phase, the Detail Design Phase.

The reviewers also concluded that documentation at Level 6 was extensive, thorough and acceptable; the documentation demonstrated that the preliminary design meets all system requirements with acceptable risk. It showed that a satisfactory design option has been selected, resource allocations have been made, interfaces have been identified, and verification methods have also been identified. The supportive design analyses confirm compliance with requirements. With regards to success criteria as listed in the PDR Terms of Reference, it was concluded that the success criteria were accomplished to complete the objectives of the PDR; however it was noted that the funding and the schedule is a concern.

The program schedule has been reviewed and it is estimated that a satellite flight model can be delivered by September 2020 dependant on full funding being secured for the programme. This includes the facilities for assembly, integration and testing being upgraded and full funding secured.

SUB-SYSTEM HIGHLIGHTS

The development process of the satellite's sub-systems is made up of all the major components progressing through a number of design phases in order to reach the acceptable level of maturity before undergoing final assembly, integration and testing. There have been

a few noteworthy developments on the sub-system level, which are described below:

MAJOR COMPONENT DEVELOPMENTAL

There are a number of components that were designed for redundancy, where one unit was bought-out and the second unit was being developed in-house with the vision of generating commercially viable products at low risk. These particular components reside in various sub-systems and are listed below (refer to pictures of components below):

- Reaction Wheels (ADCS);
- Star Cameras (ADCS); and
- X-band Horn Antenna (TT&C).

The components that were developed in-house add significantly to the IP generated through the EO-Sat1 programme. Many of these major components were developed in-house out of necessity, due to requirements derived from system architecture and sub-system interfacing/integration. Other components have been earmarked for in-house development due to their versatility of application and integration on a variety of satellite platforms.

When combined with the potential to standardise these components and customise software, an attractive set of solutions is generated for the growing export market demand for "off-the-shelf" products, and integration services, with reduced lead times. This indigenous IP therefore creates relevant technology platforms on which the local space industry can become a more significant global player, providing a greater contribution to the local space economy.

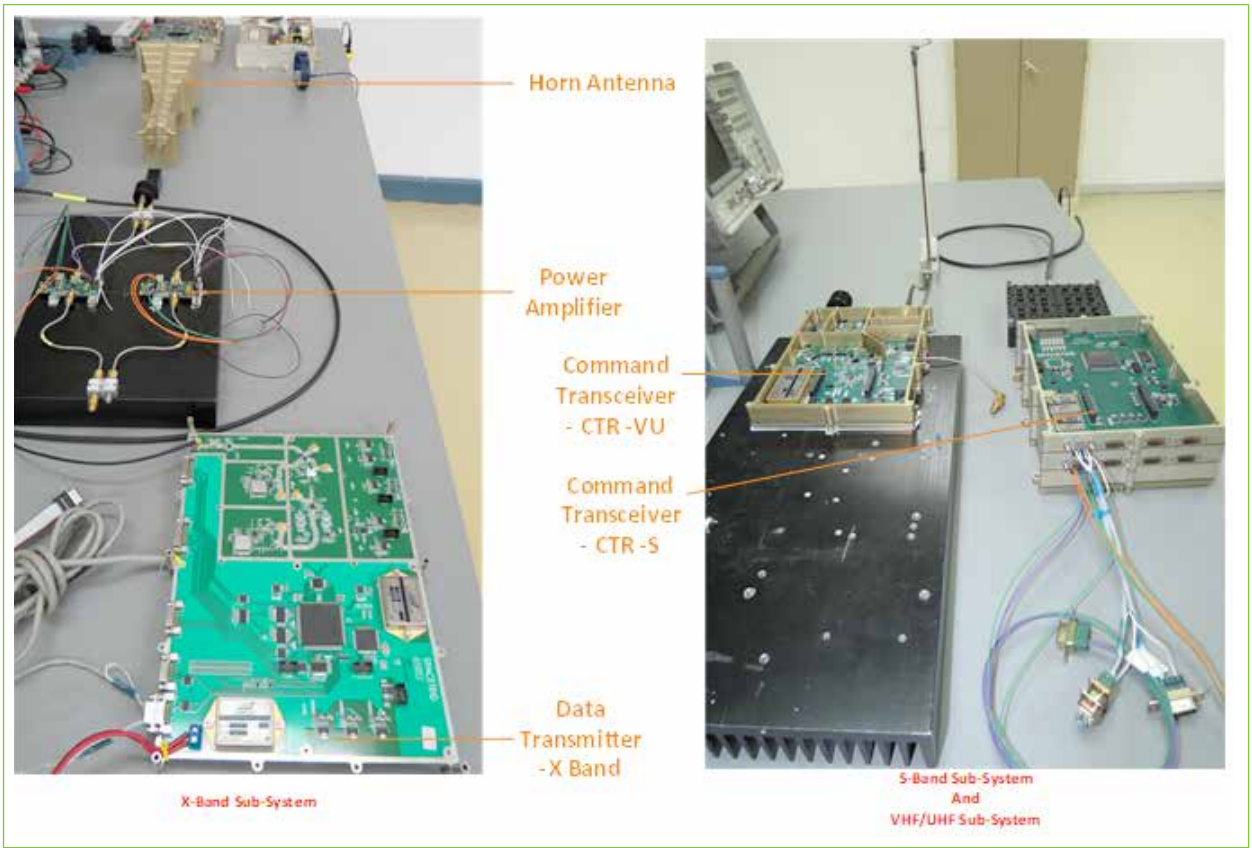


Figure 14: Communication Module

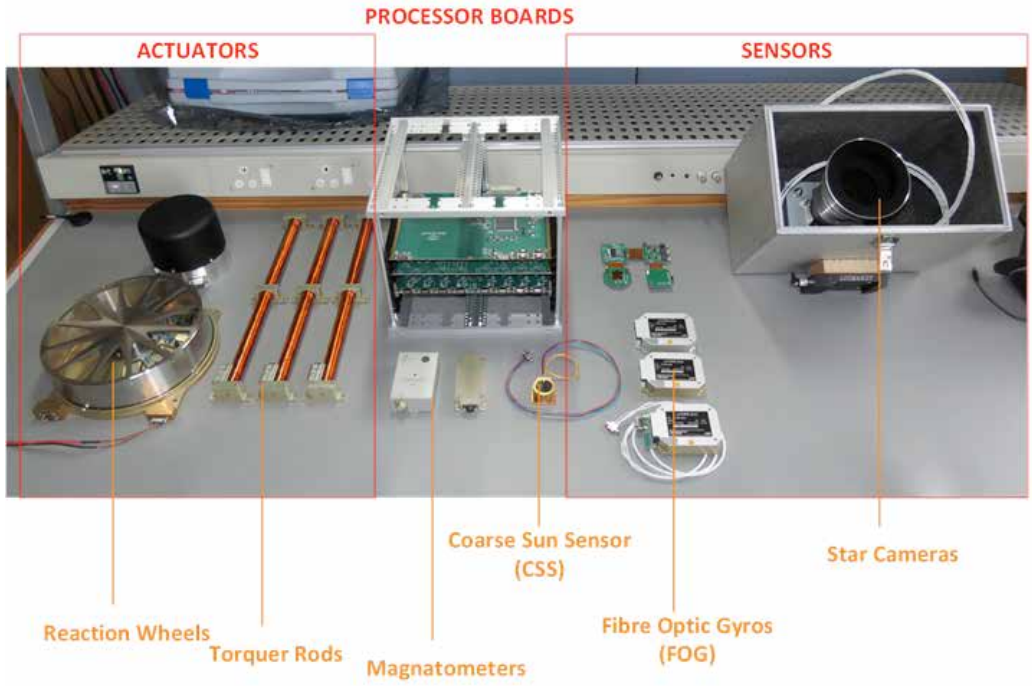


Figure 15: Attitude Determination and Control System

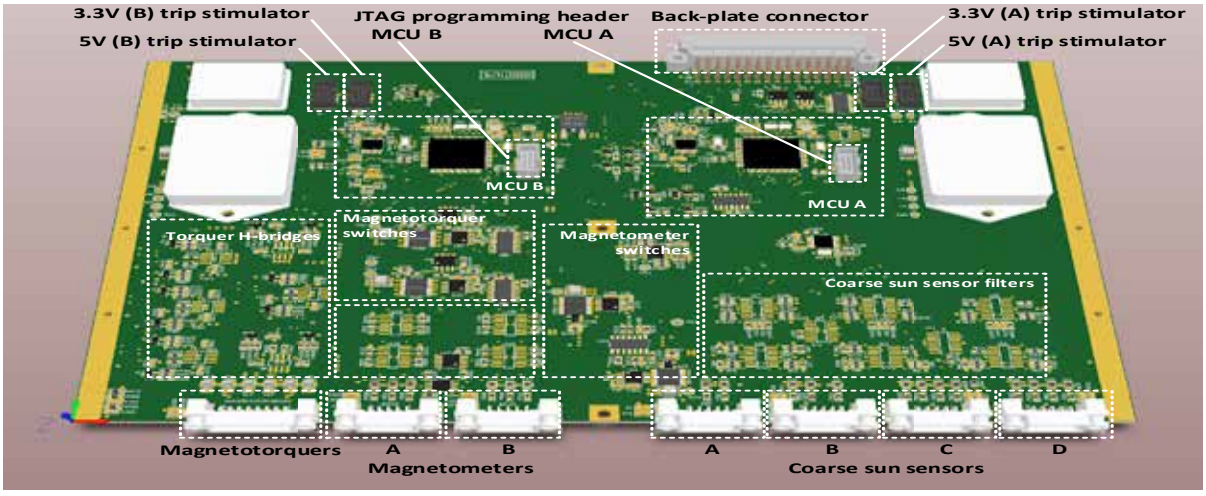


Figure 16: Attitude Determination and Control System

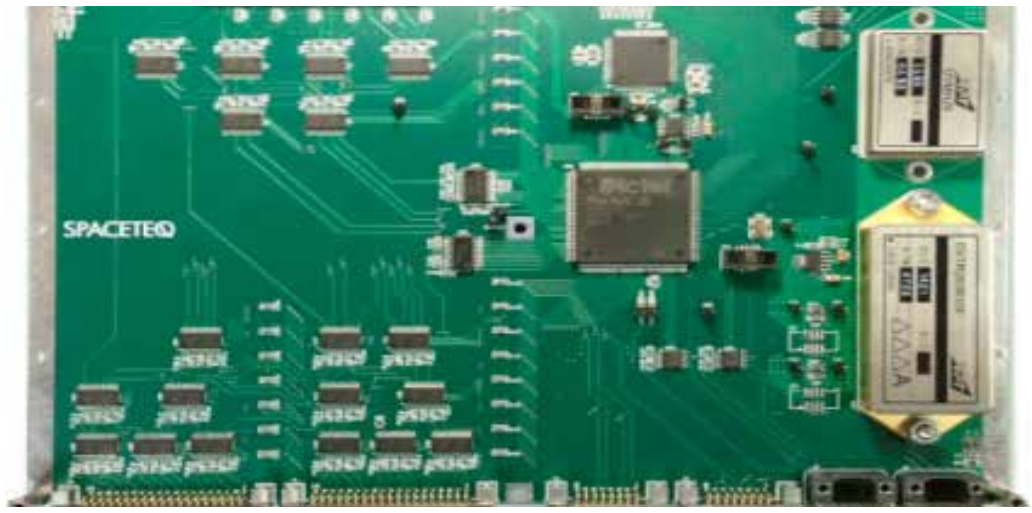


Figure 17: Computer Sotrage

The Satellite Build Program was established to revitalise the space industry in South Africa. The programme brings unique capabilities to the country and provides the resource base to meet the countries long-term objectives. The development of EO-Sat1 further reinforces our role in Africa as a leading space nation. The space economy has shown consistent growth in the last decade. It is further envisaged that within the next five years, over 3000 satellites will be launched worldwide. This provides a great opportunity for the South African industry to play a greater role in the global economy.

The potential for this investment to serve as a springboard for export opportunities will be vastly improved by the new technologies being developed through the satellite programme. Re-establishment of Houwteq will further serve as a hub attracting testing of foreign satellites, medical electronics, house appliances and general mechanical structures testing which will fund the facilities to make it available for local space and the broader industry. Although the core skills exist, the programme allows to build further local (BEE intensive) capacity and to fund the establishment of core skills in suitable SMMEs that can act as future suppliers into the larger local space companies.

However, the programme requires adequate funding in order to sustain the development of South Africa's Space programme. 2017/18 resulted in the development of certain key technologies and new intellectual property. Funding for the new financial year will need to be secured for continued development on the programme. Key challenges exist in the funding of the Space System, the technology revitalisation of Assembly, Integration and Testing facilities at Houwteq and securing a launch partner for the satellite.

OPERATION PHAKISA – ZACUBE- 2

Operation Phakisa aspires to implement an overarching, integrated ocean governance framework for sustainable growth of the ocean economy that will maximise socio-economic benefits whilst ensuring adequate ocean environmental protection within the next five years. ZACube-2 will serve as a technology demonstrator for essential subsystems required in operational nanosatellite missions. The mission will grow the core expertise of F'SATI/CPUT and its key technology partners, notably the Electronic Systems Laboratory (ESL) at the University of Stellenbosch, and validate the technology innovations that result from it. ZACube-2 has now progressed through full testing of the Satellite at the Houwteq facility.

The qualification model has been tested and has met all the requirements for the full development of the flight model. The launch of ZACube-2 is planned in September 2018 to be launched with ISRO on the Polar Satellite Launch Vehicle (PSLV). Pending the successful outcome of the technology demonstrator, SANSA envisions to commission the MDASat constellation. This will entail the production of a constellation of cubesats that will provide indigenous satellite-based Automated Identification System (AIS) data to Operation Phakisa.

Figure 18: Engineering model of ZACube-2

PART D
GOVERNANCE

12. BOARD, MANAGEMENT STRUCTURES AND GOVERNANCE

SANSA is established in terms of the SANSA Act (Act 36 of 2008, as amended), and forms part of the portfolio of entities reporting to the DST. The Agency is governed by the Public Finance Management Act (PFMA, Act 1 of 1999) 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 through the financial year ended 31 March 2018 adopted principles of the King Report on Governance *(King IV Report)* where feasible.

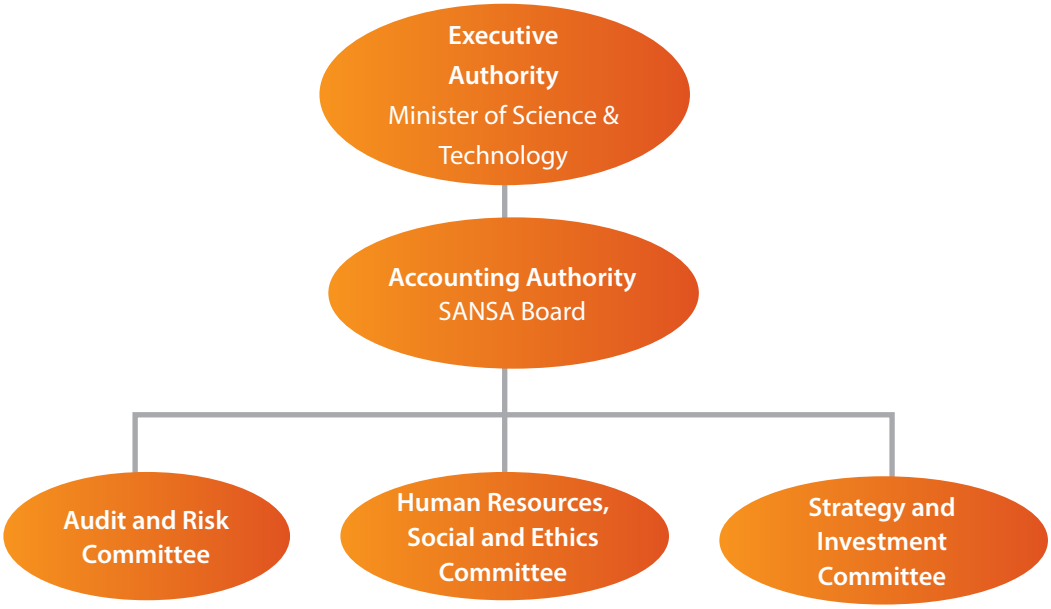


Figure 1: The Board and standing Board Committees structure.

BOARD

The Board is the Accounting Authority in terms of the PFMA and reports to the Minister of Science and Technology. The Board is responsible for providing SANSA with strategic direction and leadership and ensuring that the Agency abides by good corporate governance principles. The role and responsibilities of the Board are prescribed by the PFMA, SANSA Act and the Board Charter.

The responsibilities of the Board are dictated primarily by the SANSA Act and the PFMA. According to its legislative powers, specifically as stipulated in Section 9 of the SANSA Act, the Board's main function and responsibility 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.

BOARD CHARTER

The Charter outlines all other responsibilities of the Board as follows:

- Providing effective leadership based on an ethical foundation and ensuring that the Agency is seen as a responsible citizen;
- Acting as the custodian of corporate governance;
- Setting SANSA's direction, strategies and financial objectives and ensuring that the necessary resources are in place for the Agency to meet its objectives;
- Identifying and regularly monitoring SANSA's key risk areas and performance indicators;
- Ensuring that SANSA has an effective and independent Audit Committee;
- Ensuring that SANSA complies with the relevant laws, regulations and codes of business practice;
- Overseeing the strategy and adoption of best practices in the rollout and use of ICT systems and procedures;
- Overseeing the effective management of stakeholder relations and ensuring that the performance of the Agency is managed and measured to enhance SANSA's reputation;
- Considering business rescue measures or other turnaround mechanisms as soon as the Agency is financially distressed as defined in the Companies Act (Act 71 of 2008);
- Ensuring that the performance of the executive management is regularly assessed and monitored; and
- Supporting scientific space research-related programmes or projects.

COMPOSITION OF THE BOARD

The Minister of Science and Technology takes into account the appropriate mix of skills and qualifications when considering suitable candidates for appointment to the Board.

As at 31 March 2017, the Board consisted of a non-executive Chairperson, 15 non-executive Members and the CEO as an *ex-officio* Member, as indicated in the table below. The Board was assisted in discharging its duties by the following standing committees:

- Audit and Risk Committee;
- Strategy and Investment Committee; and
- Human Resources, Social and Ethics Committee.

Name	Designation (in terms of the Public Entity Board structure)	Date appointed	Date Board Term ended	Qualifications
Joy-Marie Lawrence	Board Chairman	1 June 2010 Extended from 1 June 2014 Reappointed 1 September 2014	to date	LLM (Masters in Law) Executive MBA with distinction; CD(SA)
Mbali Mfeka	Chairman: Audit and Risk Committee	1 September 2014	to date	BCom (Hons); Masters in Business Leadership (MBL); Management Development Programme (MDP); Global Executive Development Program (GEDP)
Johan Prinsloo	Member: Audit and Risk Committee	1 September 2014	to date	BEng (Electronic Engineering)
Simphiwe Hamilton	Member: Audit and Risk Committee	1 September 2014	to date	B Mil, a B Mil Hons (Politics) and an MDA (RMCS - UK)

Name	Designation (in terms of the Public Entity Board structure)	Date appointed	Date Board Term ended	Qualifications
Potlaki Maine	Member: Audit and Risk Committee	1 June 2010 1 June 2014 Reappointed 1 September 2014	to date	BSc (Hons) (Mathematics) (Magna-cum-laude); MSc (Information Science); CAIB (SA).
Innocentia Pule	Member: Audit and Risk Committee	8 June 2016	to date	CA(SA), BCom, Global Executive Development Programme (GEDP)
Matsie Matooane	Chairman: HR Social and Ethics Committee	1 September 2014	to date	MBA, MLS
Gaborekwe Khambule	Member: HR, Social and Ethics Committee	1 May 2013 Extended from 1 June 2014 Reappointed 1 September 2014	to date	MBA, DMS, MAP, NHDP (Meteorology)
Willie van Biljon	Member: HR, Social and Ethics Committee	1 September 2014	to date	BSc Eng (Mech), M Eng (Mech)
Vincent Gore	Member: HR, Social and Ethics Committee	1 June 2010 extended from 1 June 2014 reappointed 1 June 2014	to date	BSc (Eng) (Elec)
Ashley Naidoo	Member: HR, Social and Ethics Committee	1 September 2014	to date	BSc (Paed), Bsc (Hons); MSc (Marine Zoology)
Marius Rezelman	Chairman: Strategy and Investment Committee	1 May 2013 extended from 1 June 2014 reappointed 1 September 2014	to date	BCom (Hons)
Prof Ramesh Bharuthram	Member: Strategy and Investment Committee	1 September 2014	to date	PhD (Theoretical Plasma Physics)
Eugene Jansen	Member: Strategy and Investment Committee	1 September 2014	to date	MSc (Eng), MBA
Muso Riba	Member: Strategy and Investment Committee	1 September 2014	to date	BSc (Math, Chem), BSc (Surveying)
Dr Nozi Mjoli	Member: Strategy and Investment Committee	1 September 2014	to date	BSc (Hons), MSc (Microbiology), PhD (Microbiology)
Dr Valanathan Munsami	CEO and Member: Strategy and Investment Committee	1 January 2017	to date	PhD (Physics), MBL

Table 1: During the twelve months to 31 March 2018, the Board convened ten meetings and held one strategy session in May 2017. The Board member attendance was as shown in the table below:

BOARD MEETINGS AND ATTENDANCE

Member	Special Meeting 15/05/ 2017	Strategy Session 29/05/ 2017	Meeting 30/05/ 2017	Special Meeting 26/06/ 2017	Meeting 28/07/2017	Meeting 07/11/2017	Special Meeting 05/12/2017	Special Meeting 12/01/2018	Special Meeting 16/01/2018	Special Meeting 26/01/2018	Meeting 01/03/2018
J Lawrence	Y	Y	Y	Y	X	Y	Y	Y	Y	Y	Y
A Naidoo	X	Y	Y	X	X	Y	X	X	X	X	Y
E Jansen	Y	Y	Y	X	Y	Y	Y	Y	X	X	Y
G Khambule	X	Y	Y	X	Y	Y	Y	Y	Y	Y	Y
I Pule	X	X	Y	X	X	Y	Y	Y	Y	Y	Y
J Prinsloo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M Rezelman	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M Matooane	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M Mfeka	Y	X	Y	Y	Y	X	Y	Y	Y	X	Y
M Riba	X	X	X	X	X	X	X	X	X	X	X
N Mjoli	X	X	Y	Y	Y	Y	Y	Y	Y	X	Y
P Maine	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	Y
R Bharuthram	X	X	X	Y	Y	X	Y	Y	Y	X	Y
S Hamilton	X	X	Y	Y	Y	Y	X	Y	X	X	X
V Gore	Y	Y	Y	Y	Y	X	X	Y	Y	X	X
W van Biljon	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
V Munsami	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 2: Board Attendance

Y – present *X – apology*

SANSA BOARD MEMBERS FOR THE 2017/18 FINANCIAL YEAR

Joy-Marie Lawrence
Board Chairman

Marius Rezelman
Chairman: Strategy & Investment

Matsie Matooane
Chairman: HR, Social & Ethics

Mbali Mfeka
Chairman: Audit & Risk

Eugene Jansen

Gaborekwe Khambule

Johan Prinsloo

Innocentia Pule

Willie van Biljon

Simphiwe Hamilton

Ashley Naidoo

Dr Nozi Mjoli

Mmuso Riba

Potlaki Maine

Prof Ramesh Bharuthram

Vincent Gore

Board members as at 31 March 2018

BOARD COMMITTEES

Three standing Board Committees support the Board in discharging its functions. The responsibilities and functions of Board Committees are set out in respective Board-approved charters which are reviewed annually.

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 2018, the Committee consisted of five non-executive members as indicated in table below. Ms Mbali Mfeka was the appointed Chairperson of the Committee.

The Audit and Risk Committee provides independent oversight of:

- 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.

The Audit and Risk Committee convened four ordinary meetings and three special meetings during the twelve months ended 31 March 2018.

AUDIT AND RISK COMMITTEE MEMBERS, MEETINGS AND ATTENDANCE

Member	Special Meeting 18/04/2017	Meeting 22/05/2017	Special Meeting 25/05/2017	Meeting 18/07/2017	Meeting 18/10/2017	Special Meeting 18/01/2018	Meeting 14/02/2018
M Mfeka	Y	Y	Y	Y	Y	Y	Y
I Pule	Y	Y	X	Y	Y	Y	X
J Prinsloo	Y	Y	Y	Y	Y	Y	Y
P Maine	Y	Y	Y	Y	Y	Y	Y
S Hamilton	X	X	Y	X	X	X	X

Table 3: Committee Membership and attendance

Y – present *X – apology*

STRATEGY AND INVESTMENT COMMITTEE

As at 31 March 2018, the Strategy and Investment Committee consists of five non-executive Members and SANSA's CEO as an *ex officio* Member of the Committee. In addition, the Chief Financial Officer (CFO) and Executive Director: Space Programme serve as non-voting *ex officio* Members of the Committee. Mr Marius Rezelman was the appointed Chairperson of the Committee.

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.

As shown in Table 4, the Strategy and Investment Committee convened eight meetings during the twelve months ended 31 March 2018.

STRATEGY AND INVESTMENT COMMITTEE MEMBER, MEETINGS AND ATTENDANCE

Member	Special Meeting 18/04/2017	Meeting 17/05/2017	Meeting 14/07/2017	Special Meeting 19/07/2017	Meeting 16/10/2017	Special Meeting 10/01/2018	Special Meeting 18/01/2018	Meeting 09/02/2018
M Rezelman	Y	Y	Y	Y	X	Y	Y	Y
E Jansen	Y	Y	Y	Y	Y	X	Y	Y
M Riba	X	X	X	X	X	X	X	X
N Mjoli	Y	Y	Y	X	Y	Y	Y	Y
R Bharuthram	Y	X	Y	Y	Y	Y	X	Y
V Munsami	Y	Y	Y	Y	Y	Y	X	Y
B Pono	Y	Y	Y	Y	Y	Y	Y	Y
A Khatri	Y	Y	Y	Y	Y	Y	Y	Y

Table 4 : Committee Membership and attendance

Y – present X – apology

** The Executive Director: Enterprise Services joined the committee from 1 November 2017, and Dr Lee-Anne McKinnell was therefore a non-voting ex officio Member for the duration of being appointed as Acting Executive Director: Enterprise Services from 1 November 2017 to 31 March 2018.*

HUMAN RESOURCES, SOCIAL AND ETHICS COMMITTEE

The Human Resources, Social and Ethics Committee consists of five non-executive Members and the Executive Director: Enterprise Services as an *ex-officio* member, with no voting rights. Ms Matsie Matooane served as the Chairperson of the Committee. 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.

During the twelve months ended 31 March 2018, the Human Resources, Social and Ethics Committee convened five meetings.

HUMAN RESOURCES, SOCIAL AND ETHICS COMMITTEE MEMBERS, MEETINGS AND ATTENDANCE

Member	Meeting 18/05/2017	Meeting 26/06/2017	Meeting 20/07/2017	Meeting 02/10/2017	Meeting 16/02/2018
M Matooane	Y	Y	Y	Y	Y
A Naidoo	X	Y	X	X	Y
G Khambule	Y	Y	Y	Y	Y
V Gore	Y	Y	Y	Y	Y
W van Biljon	Y	Y	Y	Y	Y
L McKinnell*	Y	Y	Y	Y	Y

Table 5: Committee Membership and attendance

Y – present X – apology

**Dr Lee-Anne McKinnell was appointed as the Acting Executive Director: Corporate Services from 1 April 2017 to 31 October 2017, and thereafter as Acting Executive Director - Enterprise Services until 31 March 2018.*

BOARD MEMBER REMUNERATION

Board member remuneration is aligned with National Treasury guidelines 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 not paid a daily allowance when attending to SANSA business, but per hour for the actual event. However, Board members are 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) and receive a monthly cell phone and data allowance in line with SANSA's cell phone and 3G policy.

Board members who represent other government departments or institutions are not remunerated unless proof of permission to do remunerative work outside their normal official duties is submitted.

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 Management team includes the CEO, CFO, Executive Directors: Enterprise Services and Space Programme and the Managing Directors: Earth Observation, Space Science and Space Operations.

Dr Valanathan Munsami is the CEO of SANSA, and as of the 1 April 2017 a new Executive Committee for SANSA was formed. The Managing Directors within SANSA reported directly to the CEO from 1 April 2017. During the 2017/18 financial year the Corporate Services division became Enterprise Services (as of 1 November 2017) and several functions were moved from the CEO's office to Enterprise Services. In addition, the functions of Legal Services and Monitoring & Evaluation were moved to the office of the CFO.

Dr Paida Mangara was appointed as Acting Managing Director - Earth Observation for the period 1 April 2017 to 30 September 2017. Ms Andiswa Mlisa was appointed as the Managing Director - Earth Observation from 1 October 2017.

Dr Lee-Anne McKinnell was appointed as Acting Executive Director: Corporate Services from 1 April 2017 to 30 October 2017, and Acting Executive Director: Enterprise Services from 1 November 2017 to 31 March 2018. Dr Gert Lamprecht was appointed Acting Managing Director: Space Science from 1 April 2017 to 31 December 2017. Dr Lamprecht resigned effective 31 December 2017. Dr McKinnell executed both the Enterprise Services and Space Science responsibilities for the period 1 January 2018 to 31 March 2018.

EXECUTIVE MANAGEMENT TEAM

Valanathan Munsaml
CEO

Lorraine Harrison
Board Secretary

Bulelwa Pono
CFO

Amal Khatri
ED: Space Programme

Lee-Anne McKinnell
Acting ED: Enterprise Services

Andiswa Mlisa
MD: Earth Observation

Raoul Hodges
MD: Space Operations

Lee-Anne McKinnell
MD: Space Science

RISK MANAGEMENT

ENTERPRISE RISK MANAGEMENT (ERM)

During the past financial year, the main focus was to continuously improve on risk methodologies and policies, embed risk management within the organisational culture and provide strategic support to SANSA executive and management.

ERM is an integral part of SANSA's business strategy and planning and is applied across the organisation through a robust ERM Policy and Framework.

In line with the integrated risk management methodology, risks are continuously reviewed with a focus on effectiveness of controls. Regular risk assessments on both operational risk and strategic risk registers are conducted on a continuous basis in order to embed risk management principles with SANSA.

A revised ERM Policy for the organisation was approved by the Board in November 2017.

Key objectives of the ERM process included:

- Identification, assessing, mitigating and monitoring of risk;
- Risk awareness and training sessions with management and staff;
- The use of the implemented key risk indicators, which enable ongoing monitoring of risk to reduce both impact and likelihood of the occurrences;
- Quarterly monitoring and review of the risk registers (strategic and operational); and
- Quarterly monitoring and review of risk management activities by the SANSA's executive management, the Audit and Risk Committee and the Board.

The enterprise-wide risk assessment process included the identification, prioritisation and mitigation of material risks that could significantly impact SANSA's strategic objectives.

The Audit and Risk Committee and the Board are responsible for governance oversight of risk management at SANSA.

ERM is now firmly embedded and is applied across the organisation in line with the Board approved ERM Policy and Framework. The risk registers (both strategic and operational) are reviewed periodically and the current status is as follows:

The residual exposure of the top key risks as reviewed with the SANSA Executive (see Table below) indicates that up to 44.44% (i.e. a total of four) of the risk items have weak risk control effectiveness with one risk sitting on a unsatisfactory risk control effectiveness. The balance of the risk items (4) indicates that 44.44% have satisfactory to good control effectiveness levels.

The unsatisfactory and weak control matters relate to the following:

i. Failure to reach the set SANSA mandate as highlighted in the draft Strategic Framework; the SANSA Strategic Framework has been documented and approved by the Board. The financial sustainability strategy has been revised in accordance with the strategic framework and has been approved by the Board.

ii. Inability to execute and deliver on the objectives; i.e. EO-Sat1 Satellite program and Industry Development which also relates significantly to the lack of funding for the Satellite Programme. Continuous engagements are held with the DST to unbundle the funding for the Satellite Programme and the Life Cycle Costing Estimation was completed in this regard to support the funding request. A business case for the SPD including Return on Investment for EO-Sat1 for the DST has been developed.

iii. The ERP system inadequacies due the current ERP system. There is a project underway already to implement a new ERP system which assists to improve the control environment. SANSA SAGE ERP system is currently in implementation phase with the data migration underway. The project is currently on 90% towards completion, and transactions will be done on the new system from April 2018.

iv. Organisational change management challenges for the re-organisation of SANSA. The SANSA Strategic Framework has been developed and approved by the Board. The re-alignment process is underway.

v. Lack of business continuity and disaster recovery plan. The draft IT disaster recovery plan is in place. Initial meeting was held between Enterprise Risk Management, ICT, CFO and the CEO's Office to initiate the formulation of a SANSA wide Business Continuity plan. The Terms of Reference for the Business Continuity implementation team has been formulated and the team has been appointed. However, this has been delayed due to a lack of resources and will be given priority in the first half of 2018/19.

The overall effectiveness of the mitigating measures ranges between unsatisfactory and good. The table below highlights the residual risk exposure of the key risks identified.

Residual Exposure			
Actions	**Control Effectiveness**	**Number of Risks**	**Percentage**
Priority 1	Unsatisfactory	1	11.11%
Priority 2	Weak	4	44.44%
Priority 3	Satisfactory	1	11.11%
Priority 4	Good	3	33.33%

Residual Risk Exposure

The table below reflects the residual risk movement between Quarter 1 and Quarter 4.

Risk	Quarter 1 Residual Risk	Quarter 2 Residual Risk	Quarter 3 Residual Risk	Quarter 4 Residual Risk	Movement (Changes)
Failure to reach SANSA's mandate	Weak	Weak	Weak	Weak	↔
Inability to deliver on the Space Programme Unit objectives-Satellite Programme	Weak	Weak	Weak	Unsatisfactory	↓
Non Compliance to PFMA and Treasury Regulations	Good	Good	Good	Good	↔
Current ERP system not adequate	Weak	Weak	Weak	Weak	↔
Organisational change management challenges	Weak	Weak	Weak	Weak	↔
Inadequate skills to achieve SANSA's goals	Satisfactory	Satisfactory	Satisfactory	Satisfactory	↔
Lack of business continuity (disaster recovery plan)	Weak	Weak	Weak	Weak	↔
Inadequate institutional performance management	Satisfactory	Satisfactory	Satisfactory	Good	↑
Infrastructure failure	Good	Good	Good	Good	↔

Table 6: Quarterly movement of residual risk exposure

FRAUD RISK MANAGEMENT

There is an Anti-Fraud Management Policy and Fraud Prevention Plan in place which provides guidelines to management on how to deal and manage fraud, corruption and any unethical behaviour. These two documents were revised during the 2017/18 financial year and approved by the Board in November 2017. The Fraud Prevention Plan seeks to address the following, among others:

- Early detection and prevention of fraud;
- Investigate fraud to minimise any negative impact;
- Raise fraud awareness within SANSA;
- Encourage a culture within and for SANSA where all employees, public and other stakeholders behave ethically in dealings with or on behalf of SANSA; and
- Report fraud, corruption or any other unethical behaviour that could have an undesirable impact on SANSA through the fraud hotline.

The fraud hotline is functional and there have been incidents reported via the hotline. All incidents have been investigated and closed for the 2017/18 financial year.

SAFETY, HEALTH, ENVIRONMENT AND QUALITY (SHEQ)

The implementation of the planned SHEQ management activities identified and mitigated SHEQ risks effectively and ensured that SANSA continues to comply with SHEQ training and certification. Quarterly SHEQ meetings are held at all SANSA worksites and due attention is paid to maintaining a safe and healthy working environment as well as delivering quality outputs.

SAFETY AND HEALTH

In ensuring the health and safety environment, the SANSA Hartebeesthoek worksite was certified on OHSAS 18001: 2007, ISO 14001:2004 and ISO 9001:2008 Standards in October 2017 by DQS (Deutsche Quality Systems).

There have been no major incidents and the SANSA Disabling Injury Frequency Rate (DIFR) remains at 0.

ENVIRONMENT

SANSA is committed to minimising its impact on the environment and maximising its responsible use of natural resources. Activities in this regard included controlled waste disposal and recycling, as well as ongoing communication and awareness creation about managing the available energy resources, such as electricity and water consumption. The removal of invasive species at both the Hermanus and Hartebeesthoek worksites is well under way.

QUALITY

The focus of SANSA's quality activities is to:

- establish and maintain a certified Quality Management System and SHE Management System according to ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007;
- maintain accreditation for focused courses such as compass swing training; and
- communicate quality procedures, best practices and knowledge throughout the Agency.

AUDIT COMMITTEE REPORT

The Audit and Risk Committee is pleased to present its report for the financial year ended 31 March 2018.

The Audit and Risk Committee comprises the members listed on page XX of this Annual Report and is required to meet at least four times per annum, as per its approved Terms of Reference. During the period under review the Committee met seven times. The Committee Members' meeting attendance is disclosed on page 87 of this annual report.

RESPONSIBILITIES OF THE AUDIT AND RISK COMMITTEE

The Committee has adopted appropriate formal Terms of Reference in its Audit and Risk Committee Charter, which are line with the requirements of Section 51(1) (a) of the PFMA (1999) as well as with its responsibilities as set out in Treasury Regulations 3.1.13 and 27.1. The Committee regulated its affairs in compliance with the Charter and discharged its responsibilities contained therein.

THE EFFECTIVENESS OF INTERNAL CONTROLS

Our review of the findings of the Internal Audit work, based on the risk assessments conducted, revealed certain weaknesses, which were raised with the public entity.

The Committee is satisfied that an adequate system of internal controls is in place to mitigate risks to an acceptable level and that these controls were effective during the financial year under review. Internal Audit provided the Audit and Risk Committee with the assurance that the internal controls were appropriate and effective.

RISK MANAGEMENT

The Audit and Risk Committee are kept abreast of developments through scheduled meetings in accordance with the Board-approved year plan. Risk assessment is conducted annually at strategic and operational levels and aligned with the Agency's strategic planning process. The risks are captured and documented in a risk register and monitored on an ongoing basis as directed in the risk mitigation strategies.

The Committee is satisfied with the ongoing risk management process of identifying, assessing, managing and monitoring both strategic and operational risks within the organisation.

INTERNAL AUDIT

The Committee monitors and evaluates the activities of the Internal Audit function. The Internal Audit Manager reports directly to the Audit and Risk Chairperson and administratively to the Chief Executive Officer. The SANSA internal audit unit has adopted a co-sourced model whereby the organisation makes use of an internal audit service provider as well as an in-house auditor to meet the mandate and responsibilities of the unit.

The Internal Audit Plan and the Internal Audit Charter is reviewed and approved by the Committee on an annual basis. The Internal Audit assignments were successfully completed during the financial period.

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

IN-YEAR MANAGEMENT AND QUARTERLY REPORTING

SANSA has submitted quarterly reports to the Executive Authority as required. The Committee has reviewed these reports and is satisfied that the Board and Executive Authority were kept abreast of the activities of the entity and progress on its performance information and financial management.

GOING CONCERN

The Committee has reviewed Management's assessment of the going concern status of SANSA and has made the recommendation to the Board that SANSA is a going concern.

RECOMMENDATION OF THE 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.
- Reviewed the Agency's compliance with legal and regulatory provisions.
- Reviewed significant adjustments resulting from the audit.

The Committee concurs with, and accepts, the External Auditor's report included in the 2017/18 Annual Financial Statements.

AUDITOR'S REPORT

The Audit and Risk Committee concurs and accepts the conclusions of the external auditor on the Annual Financial Statements and is of the opinion that the audited Annual Financial Statements be accepted and read together with the report of the auditor.

Ms Mbali Mfeka

Chairperson
Audit and Risk Committee

PART E
HUMAN RESOURCE MANAGEMENT

13. HUMAN RESOURCE MANAGEMENT

INTRODUCTION

SANSA recognises the invaluable contribution of the people who make the organisation successful. The achievement of SANSA's goals and objectives is not possible without the hard work, dedication and commitment of the SANSA team.

The human resource management programme for the reporting period was aligned with the SANSA business requirements. This section of the annual report reflects on the performance against high-level strategic priorities during the past year, and highlights key achievements of the programme as well as of a few of the many talented individuals who form the SANSA team. The key statistics are also provided.

PRIORITIES AND KEY ACHIEVEMENTS

ORGANISATIONAL CULTURE PROJECT

Addressing the organisational culture challenges was a priority for SANSA in 2017/18. Culture Change workshops were held with all team members across the organisation with the aim to depict a "desired culture" for SANSA going forward. Very positive and meaningful contributions were received which will be used as base to work from in creating the new "SANSA Way". The SANSA Executive Team are leading and driving this project with the involvement of all SANSA team members. A change management action plan was put in place for the year, and 80% of the action items were completed before the end of March 2018. This process was seen as the beginning of moving towards the new SANSA.

Figure 1: SANSA team members discussing the desired culture for SANSA

HR POLICIES, PROCESSES & STANDARD OPERATING PROCEDURES

The HR policy, procedure, guidelines and scheme review project commenced during 2017/18. Given the importance of employee input to HR policies, a decision was taken to open all HR policies for employee input prior to seeking final approval. In this regard, a guideline was generated for the review of policies, and a new email address entitled "HR in Partnership" was created. The policies are circulated to employees via this email address and are "open" for comments for a period of two weeks.

The first five policies in the priority list (Recruitment and Selection, External Bursary, Performance Management, Leave, and Promotions, Secondment and Transfer) were approved by the Board in November 2017. The revised performance incentive scheme was also approved by the Board. The second set of policies including Job Evaluation; Remuneration and Reward; Non-discrimination in the Workplace; Health, Wellness and Disability; Remote Location Allowance; Grievance; and Disciplinary were all approved by the Board in March 2018.

In addition to the review of policies, the HR team have also revised and developed procedures for performance management, job evaluation, grievance and disciplinary. The project is approximately 70% complete with the final 30% due for review in 2018/19.

EMPLOYEE WELLNESS

SANSA continued to partner with the Employee Wellbeing partner, ICAS, to provide an employee wellness programme on various platforms. The services offered by ICAS to SANSA employees have been promoted throughout the organisation, and the employees are actively using ICAS services for themselves and their dependents. In addition, ICAS presentations on various wellness topics were held at all SANSA facilities.

SANSA's Wellness Programme focused on the promotion of healthy behaviour in the workplace and improvements in general health outcomes. As part of the Programme, Wellness Days were held at all SANSA facilities. Activities included health assessments, financial planning advice, and fitness advice. There were also fun activities, such as races, fun walks, aerobics and a dance competition. These interventions were aimed at enhancing engagement and creating a positive climate in the workplace.

Figure 2: SANSA team members on the fun walk during the Pretoria worksite employee wellness day

MANAGEMENT DEVELOPMENT

An immediate benefit of management development training is the improvement of skills and knowledge within the management team, and this area was prioritised during 2017/18. A series of scheduled management training sessions were organised for the Pretoria worksite managers. A total of six topics were covered over six days between November 2017 and March 2018. These topics were:

- Personal Effectiveness:
- Effective People Management:
- Performance Management:
- Communication Skills:
- Conflict Management Skills: and
- Mentoring and Coaching

Figure 3: Managers attend lessons on how to improve performance management

In addition to the series of management training sessions, managers at the Hermanus worksite attended three management training sessions that included change management, stakeholder relations and people management. At the Pretoria worksite 19 managers attended a Stakeholder Management course. This initiative was to address a need for better relationship management and improved partnering between line managers and their employees with an aim of equiping them with the skills to effectively communicate, engage and manage these relationships at a professional level.

All of the management training sessions across the organisation were highly interactive and informative. In order to sustain the lessons learned and keep the momentum of management improvement, regular managers "think tank" sessions will be held with the aim to share knowledge and experiences amongst each other.

PERFORMANCE MANAGEMENT SYSTEM

As part of the Culture Change initiative and SANSA's commitment to excellence and the move towards a high-performing culture within the agency, a specific effort has been undertaken to review the performance management system.

During 2017/18 the newly revised Performance Management Policy, Procedure and Performance Incentive Scheme were approved. In addition, a Performance Management Toolkit was designed and approved for implementation. This toolkit gives managers an overview of guidelines, tools and resources available to support them in this important aspect of people management. These documents were revised and developed in order to address and assist in instilling a performance culture at SANSA.

The revised Performance Agreement template was implemented during the Mid-Year Review process. Team members were provided with the opportunity to comment on the effectiveness thereof. Suggested changes were incorporated and a full implementation of the new performance approach will be in place for the 2018/19 performance cycle.

HUMAN RESOURCE OVERSIGHT STATISTICS

The Human Resource Statistics report shows data on the entire SANSA workforce. The data is presented graphically for ease of reference. The SANSA workforce includes employees with disability, both temporary and permanent.

In the 2017/18 financial year the total workforce was made up of 183 employees. The figure below shows employment equity profile of 63% African; 9% Coloured; 6% Indians and 22% White.

SANSA's employment equity profile by race and gender, highlights 68 African males and 48 females; eight Coloured males and eight females; eight Indian males and two females and lastly 27 White males and 14 females. Slight improvement compared to the 2016/17 financial year which included 70 women represented on the workforce, there are 72 females for 2017/18 and 111 males. Inadequate funding still poses a big challenge in implementing SANSA's talent management initiatives and the Organisational Realignment process which resulted in some talent initiatives being placed on hold.

The workforce is profiled by race, gender and job category. In the engineering category employees are made up of four African males and two females; one Coloured male; five White males and one female. Leadership/Senior management representation has two African females; two Indian males; one White male and one White female. In the Science/Researcher category SANSA employs 11 African males and seven females; two Indian males and four White males. The support\administration function is where the bulk of the workforce is represented with 22 African males and 28 females; five Coloured males and seven females; one Indian male and two females; five White males and 10 White females. Lastly technical category representation is made up of 31 African males and 9 females; two Coloured males and one female; three Indian males; 12 White males and two white females.

The table below indicates that the workforce is made up of 159 permanent employees and 24 temporary employees including two who are living with disability.

SANSA recognises that attention is needed with a focus on the women representation within the organisation especially in the Science, Engineering and Technology job categories. Relevant initiatives will be rolled out in the next financial years to address these challenges. SANSA is committed to achieving gender balance at all levels by 2020 and to ensuring that gender considerations are part of its programs and projects.

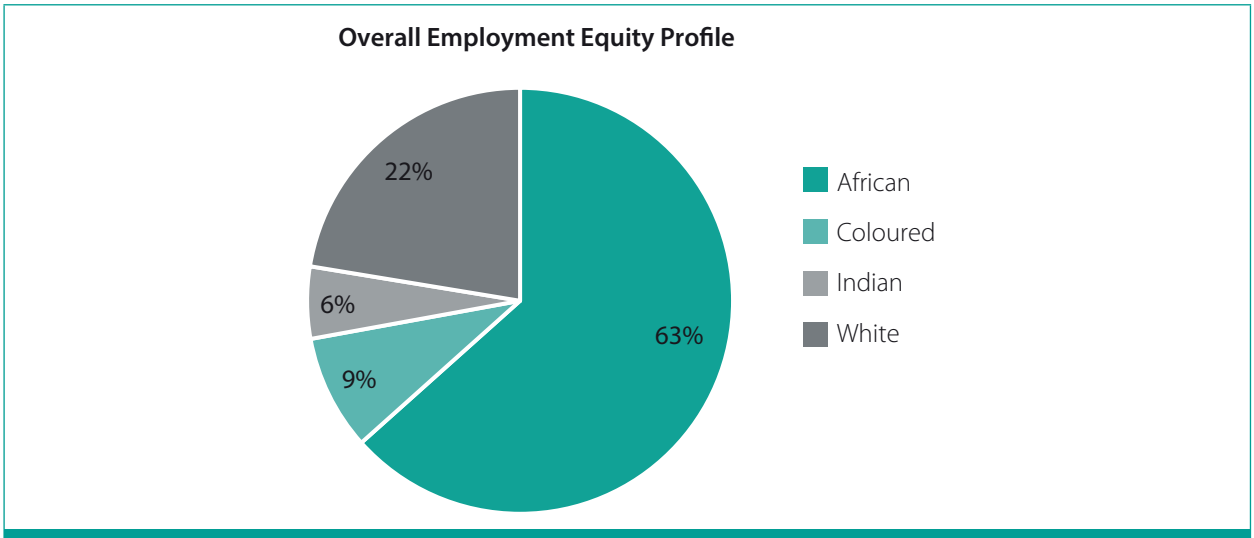


Figure 4: The SANSA wide overall employment equity profile as of 31 March 2018

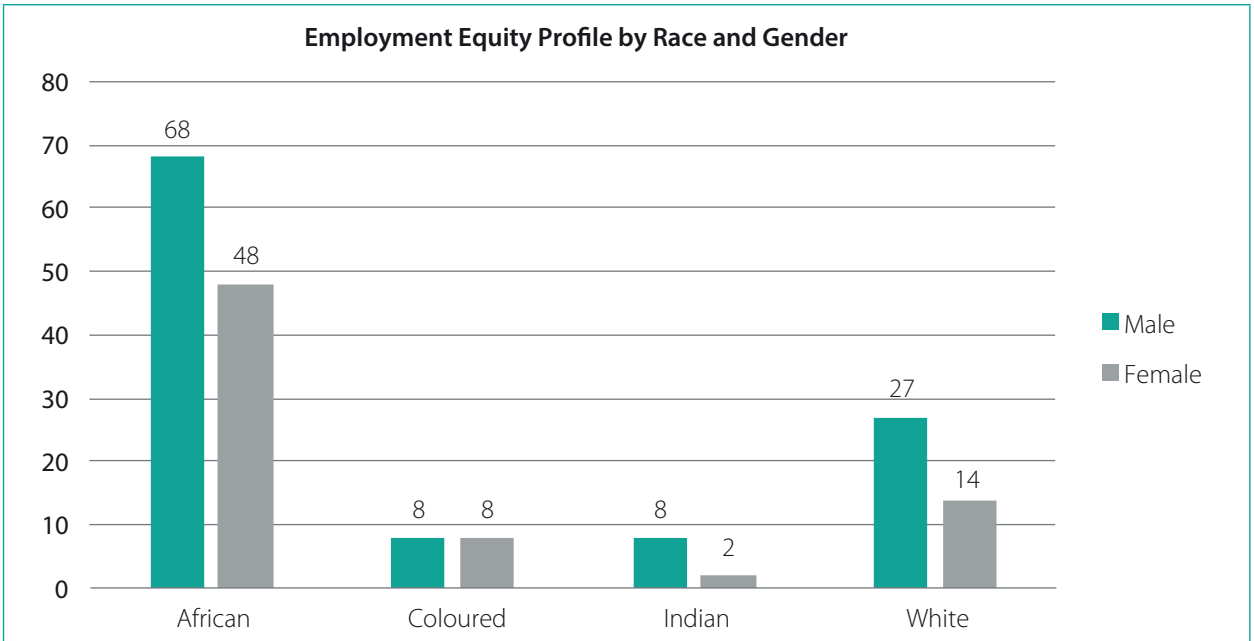


Figure 5: The SANSA wide employment equity profile by race and gender as of 31 March 2018

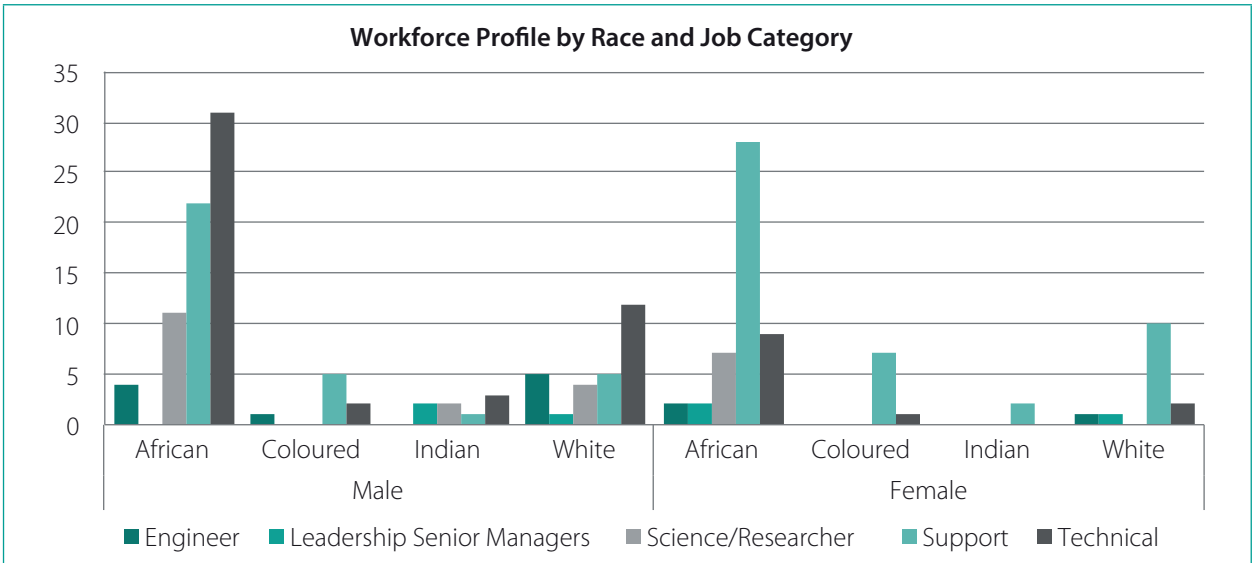


Figure 6:The SANSA workforce profile indicated by race and job category

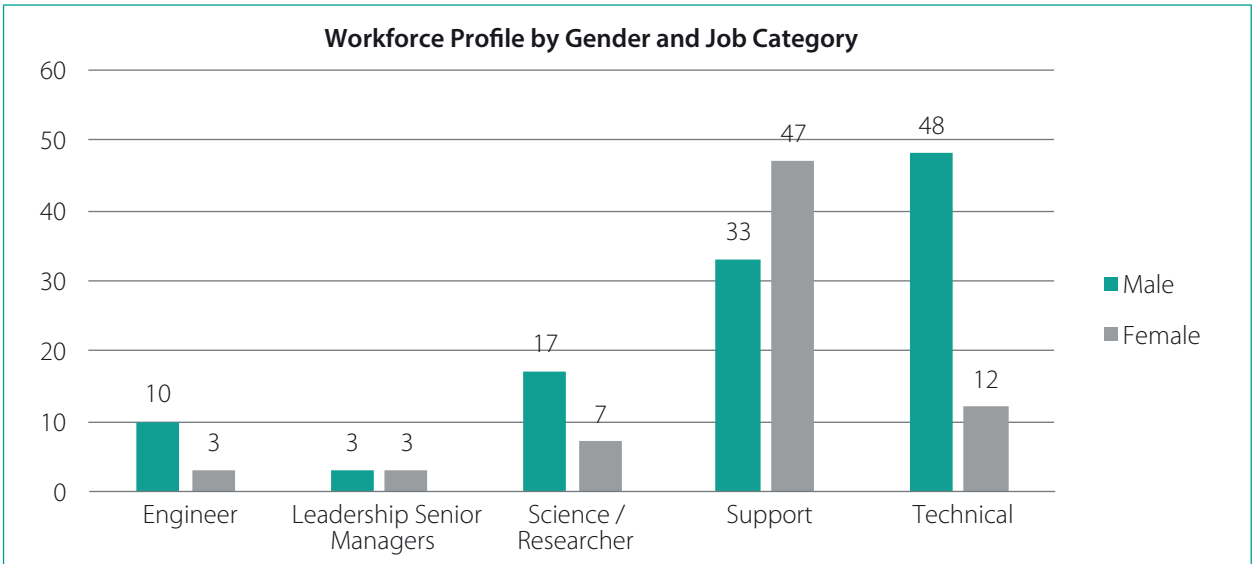


Figure 7:The SANSA workforce profile indicated by gender and job category

TOTAL NUMBER OF EMPLOYEES (INCLUDING EMPLOYEES WITH DISABILITIES) BY OCCUPATIONAL CATEGORY:

Indicator description	Males				Females				Foreign Nationals		Total
	Africans	Coloureds	Indians	Whites	Africans	Coloureds	Indians	Whites	Male	Female	
Top management	0	0	1	0	0	0	0	0	0	0	1
Senior management	0	0	1	1	2	0	0	1	0	0	5
Professionally qualified and experienced specialists and mid-management	16	1	3	10	10	1	2	6	0	0	49
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents	39	4	3	8	24	3	0	6	0	0	87
Semi-skilled and discretionary decision making	7	2	0	0	5	2	0	0	0	0	16
Unskilled and defined decision making	1	0	0	0	0	0	0	0	0	0	1
TOTAL PERMANENT	**63**	**7**	**8**	**19**	**41**	**6**	**2**	**13**	**0**	**0**	**159**
TEMPORARY / CONTRACT EMPLOYEES	**5**	**1**	**0**	**8**	**7**	**2**	**0**	**1**	**0**	**0**	**24**
GRAND TOTAL	**68**	**8**	**8**	**27**	**48**	**8**	**2**	**14**	**0**	**0**	**183**
EMPLOYEES WITH DISABILITIES	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**

Table 7: The SANSA workforce (including employees with disabilities) by occupational category

PART F
FINANCIAL INFORMATION

14. INDEPENDENT AUDITOR'S REPORT TO PARLIAMENT ON THE 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 108 to 166, which comprise the statement of financial position as at 31 March 2018, 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 the 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 2018, and its financial performance and cash flows for the year then ended in accordance with South African Standards of Generally Recognised Accounting Practice (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 this auditor's report.

4. We are independent of the public entity in accordance with the Independent Regulatory Board for Auditors' Code of professional conduct of registered auditors (IRBA code) and other independence requirements applicable to performing audits of the financial statements in South Africa. We have fulfilled our other ethical responsibilities in accordance with the IESBA code and in accordance other ethical requirements applicable to performing audits in South Africa. The IRBA code is consistent with the International Ethics Standards Board for Accountants' Code of ethics for professional accountants (parts A and B).

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

RESPONSIBILITIES OF THE ACCOUNTING AUTHORITY FOR THE FINANCIAL STATEMENTS

6. 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 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 of South Africa, 2004 (Act No. 25 of 2004) (PAA) and the general notice issued in terms thereof, we have a responsibility to report material findings on the reported performance information against predetermined objectives for the selected programmes presented in the annual performance report. We performed procedures to identify findings but not to gather evidence to express assurance.

11. Our procedures address the reported performance information, which must be based on the approved performance planning documents of the entity. We have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. Our procedures also did not extend to any disclosures or assertions relating to 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 programmes presented in the annual performance report of the entity for the year ended 31 March 2018:

Programmes	Page
Strategic Goal 1 - Address South Africa's challenges through space services and products.	40
Strategic Goal 4 - Enhance the competitiveness of the South African space industry.	41

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 programmes:

- Strategic Goal 1 - Address South Africa's challenges through space services and products.
- Strategic Goal 4 - Enhance the competitiveness of the South African space industry.

OTHER MATTERS

We draw attention to the matters below.

Achievement of planned targets

15. Refer to the annual performance report on pages 40 to 44 for information on the achievement of planned targets for the year and explanations provided for the under/ over achievement of a number of targets.

REPORT ON THE AUDIT OF COMPLIANCE WITH LEGISLATION

INTRODUCTION AND SCOPE

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

17. We did not raise 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

18. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report, which includes the accounting authority's reports and the audit committee report. The other information does not include the financial statements, the auditor's report and those selected programmes presented in the annual performance report that have been specifically reported in this auditor's report.

19. Our opinion on the financial statements and 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.

20. 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 programmes presented in the annual performance report, or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

21. We did not receive the other information prior to the date of this auditor's report. After we receive and read this information, and if we conclude that there is a material misstatement, we are required to communicate the matter to those charged with governance and request that the other information be corrected. If the other information is not corrected, we may have to retract this auditor's report and re-issue an amended report as appropriate. However, if it is corrected this will not be necessary.

INTERNAL CONTROL DEFICIENCIES

22. 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

23. We draw attention to the following engagements conducted by various parties that have or could potentially have an impact on the public 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 and special audits

24. 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 2017 to 31 December 2017 and was issued to the South African National Space Agency management on the 21st June 2018.

AUDITOR TENURE

25. 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 1 year.

Nexia SAB&T

Per: Aneel Darmalingam

Director

Registered Auditor

31 July 2018

Centurion

Nexia SAB&T
accountants | auditors | consultants

ANNEXURE – AUDITOR'S RESPONSIBILITY FOR THE AUDIT

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 reported performance information for selected programmes and on the entity's compliance with respect to the selected subject matters.

FINANCIAL STATEMENTS

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 accounting authority.
- conclude on the appropriateness of 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 related to events or conditions that may cast significant doubt on the South African National Space Agency's ability 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 the opinion on the financial statements. Our conclusions are based on the information available to me at the date of this auditor's report. However, future events or conditions may cause an entity to cease continuing as a going concern.
- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

COMMUNICATION WITH THOSE CHARGED WITH GOVERNANCE

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.

We also confirm to the accounting authority that we have complied with relevant ethical requirements regarding independence and communicate all relationships and other matters that may reasonably be thought to have a bearing on our independence and, where applicable, related safeguards.

From the matters communicated to those charged with governance, we determine those matters that were of the most significance in the audit of the financial statements of the current period and are therefore key audit matters. We describe these matters in this auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in this auditor's report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest of such communication.

STATEMENT OF FINANCIAL POSITION

For the year ended 31 March 2018

	Note	2018 R	2017 R
ASSETS			
Current Assets		**123 125 425**	**172 021 594**
Cash and Cash Equivalents	**5**	97 223 484	150 757 680
Receivables from exchange transactions	**6**	25 393 824	20 800 639
Inventory	**7**	508 117	463 275
Non-Current Assets		**447 518 708**	**364 814 245**
Property, Plant and Equipment	**8**	431 423 674	344 714 713
Intangible Assets	**9**	16 095 034	20 099 532
Total Assets		570 644 133	536 835 839
LIABILITIES			
Current Liabilities		**86 201 490**	**129 531 895**
Trade and Other Payables from Exchange Transactions	**10**	22 108 665	20 850 135
Provisions	**11**	6 005 146	7 645 025
Liability held on behalf of Principal	**17**	-	9 268 569
Committed Conditional Grant Liability	**12**	58 087 679	86 815 945
Current Portion -Long Term Liability	**13**	-	4 875 500
Operating Lease Liability	**14**	-	76 721
Total Liabilities		**86 201 490**	**129 531 895**
NET ASSETS		**484 442 643**	**407 303 944**
Accumulated Surplus	**15**	484 442 643	407 303 944
Total Net Assets		**484 442 643**	**407 303 944**

STATEMENT OF FINANCIAL PERFORMANCE

For the year ended 31 March 2018

	Note	2018 R	2017 R
REVENUE			
Revenue from Non-exchange Transactions			
Transfers and Subsidies Received	**16**	218 951 382	227 232 738
Revenue from Exchange Transactions			
Interest Income	**18**	8 310 533	9 578 633
Rendering of Services	**19**	87 810 375	71 764 813
Other Income	**20**	4 776 010	1 835 459
Total Revenue		**319 848 300**	**310 411 643**
EXPENDITURE			
Employee and Employee Related Costs	**21**	110 474 811	104 695 500
Board Member Remuneration	**22**	1 170 199	1 069 887
Depreciation and Amortisation	**23**	25 399 526	23 878 330
Repairs and Maintenance	**24**	10 533 545	7 435 449
Finance Costs	**25**	-	24 339
Data Licence fees	**26**	34 451 213	36 124 088
Student Bursaries and Research Grants Paid	**27**	5 620 792	5 452 793
Antenna Infrastructure Services	**28**	3 270 496	203 266
Training Expenses	**29**	1 226 374	1 720 023
General Expenses	**30**	48 596 577	42 370 356
Net Losses on foreign exchange transactions	**31**	1 861 044	1 352 017
Net Loss on Disposal of Property, Plant and Equipment	**32**	96 109	564 608
Bad debts	**34**	8 916	
Total Expenditure		**242 709 601**	**224 890 655**
SURPLUS FOR THE YEAR [1]		**77 138 699**	**85 520 988**

[1] The surplus for the year mainly represents capital transfers declared in revenue of R76.6 million. Refer to note 16.1 reconciliation of movements in ring-fenced grants under conditions met transferred to revenue.

STATEMENT OF CHANGES IN NET ASSETS

For the year ended 31 March 2018

Description	Accumulated Surplus	Total
	R	R
2017		
Balance at 1 April 2016	**321 782 956**	**321 782 956**
Surplus for the year	85 520 988	85 520 988
Balance as at 31 March 2017	**407 303 944**	**407 303 944**
Balance at 1 April 2017	**407 303 944**	**407 303 944**
Surplus for the year	77 138 699	77 138 699
Balance as at 31 March 2018	**484 442 643**	**484 442 643**

CASH FLOW STATEMENT

For the year ended 31 March 2018

	Note	2018 R	2017 R
CASH FLOWS FROM OPERATING ACTIVITIES			
Receipts			
Grants	**16**	189 213 350	227 232 738
Grants received on behalf of principal	**17**	-	(18 353 253)
Sales of goods and services		87 810 375	71 764 813
Interest Income		8 310 533	9 578 633
Other Receipts		4 776 010	1 835 459
Payments			
Employee Costs		(110 474 811)	(104 695 500)
Suppliers		(110 374 004)	(89 748 100)
Payments on behalf of principal	**17**	(8 258 803)	(8 258 803)
Interest Paid		-	(24 339)
NET CASH FLOWS FROM / (RECEIVED IN) OPERATING ACTIVITIES	**33**	**61 002 651**	**89 331 648**
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchase of Property, Plant and Equipment	**8**	(106 462 290)	(104 503 038)
Purchase of Intangible Assets	**9**	(2 652 008)	(5 621 340)
NET CASH FLOWS (USED IN) INVESTING ACTIVITIES		**(109 114 298)**	**(110 124 378)**
CASH FLOWS FROM FINANCING ACTIVITIES			
Movement in Long term liability		(5 422 550)	(6 908 129)
NET CASH FLOWS (USED IN)/ FROM FINANCING ACTIVITIES		**(5 422 550)**	**(6 908 129)**
NET (DECREASE) INCREASE IN CASH AND CASH EQUIVALENTS		**(53 534 197)**	**(27 700 859)**
Cash and Cash Equivalents at the beginning of the year	**5**	150 757 680	178 458 539
Cash and Cash Equivalents at the end of the year	**5**	97 223 484	150 757 680

STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS

For the year ended 31 March 2018

	Note	Approved Budget	Final Budget	Actual Amounts on a Comparable Basis	Difference
		2017/18	2017/18	2017/18	2017/18
Revenue		R	R	R	R
Revenue from Non-exchange Transactions		**247 907 000**	**262 763 259**	**285 297 863**	**22 534 605**
Parliamentary Grant		131 226 000	131 226 000	131 226 000	-
Ring Fenced Transfers	**4.3.1**	114 681 000	110 847 428	131 827 427	20 979 999
Research Grants	**4.3.2**	2 000 000	5 449 566	7 004 171	1 554 605
Post graduate student bursary support		-	5 971 696	5 971 696	-
Principal agent transfers		-	9 268 569	9 268 569	-
Revenue from Exchange Transactions	**4.3.3**	**67 158 230**	**70 595 638**	**87 810 376**	**17 214 738**
Contract Income: Public		23 587 178	22 888 860	21 582 437	(1 306 423)
Contract Income: Private		1 063 400	4 277 768	4 148 748	(129 020)
Contract Income: Foreign		42 507 652	43 429 010	62 079 191	18 650 181
Finance and other Income	**4.3.4**	-	10 531 823	13 086 543	2 554 720
Prior years Surplus Retained		-	46 958 834	46 958 834	-
Total Revenue		**315 065 230**	**390 849 554**	**433 153 616**	**42 304 063**
Economic Classification					
Current Payments					
Compensation of Employees	**4.3.5**	119 492 170	120 105 951	110 474 811	9 631 141
Board Costs		1 023 830	1 023 830	1 170 199	(146 368)
Principal -Agent transfers		-	9 268 569	8 258 803	1 009 767
Goods and services	**4.3.6**	85 271 067	142 343 517	131 064 592	11 278 926
		205 787 067	**272 741 867**	**250 968 404**	**21 773 465**
Payments for Capital Assets					
Machinery and equipment	**4.3.7**	6 771 503	42 107 943	29 929 159	12 178 784
Software and intangible assets	**4.3.8**	1 255 895	5 174 553	2 652 008	2 522 545
Vehicles		-	-	874 999	(874 999)
Satellite Development	**4.3.9**	101 250 764	70 825 191	76 533 131	(5 707 940)
		109 278 162	**118 107 687**	**109 989 297**	**8 118 390**
Total Expenditure		**315 065 229**	**390 849 553**	**360 957 701**	**29 891 855**
Surplus/Deficit		-	-	72 195 917	**72 195 917**

STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS

For the year ended 31 March 2018

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**
	R	**R**	**R**	**R**
Actual Amount on Comparable Basis as Presented in the Budget and Actual Comparative Statement	**182 185 212**	**-**	**(109 989 297)**	**72 195 917**
Basis Differences	(121 182 561)	(5 422 550)	874 999	(125 730 112)
Actual amount in Cash Flow Statement	**61 002 651**	**(5 422 550)**	**(109 114 298)**	**(53 534 197)**

ACCOUNTING POLICIES

For the year ended 31 March 2018

1. BASIS OF PRESENTATION

The annual financial statements have been prepared using the accrual basis of accounting, in terms of which items are recognized as assets, liabilities, net assets, revenue and expenses when they satisfy the definitions and recognition criteria for those elements, which in all material aspects are consistent with those applied in the previous year, except where a change in accounting policy has been recorded. The historic cost convention has been used, except where indicated otherwise.

The Annual Financial Statements are prepared in South African Rand (R) and have been prepared on a going concern basis.

1.1 STATEMENT OF COMPLIANCE

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 presented Annual Financial Statements have been rounded to the nearest Rand value. The impact that the rounding will have on the disclosed numbers in the Annual Financial Statements, will not be material and should not significantly understate nor overstate the reported numbers.

1.2 CRITICAL JUDGEMENTS, ESTIMATIONS AND ASSUMPTIONS

1.2.1 Going concern assumption

The Annual Financial Statements have been prepared on a going concern basis. This basis presumes that funds will be available to finance future operations and that the realisation of assets and settlement of liabilities, contingent liabilities and commitments will occur in the ordinary course of business.

1.2.2 Judgements and estimations

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 critical 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:

1.2.3 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 1.7.2 on Financial Assets Classification and Accounting Policy 1.7.3 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.

ACCOUNTING POLICIES

For the year ended 31 March 2018

1.2.4 Impairment of Financial Assets

Accounting Policy 1.7.5 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 used its judgement to select a variety of methods and make assumptions that 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.

1.2.5 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.

1.2.6 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.

1.2.7 Provisions and Contingent Liabilities

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.

1.2.8 Revenue Recognition

Accounting Policy 1.9.2 on *Revenue from Exchange Transactions* and Accounting Policy 1.9.3 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.

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 profit or loss in proportion to the stage of completion of the contract.

The stage of completion is assessed by reference to work performed as at reporting date. 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.

1.3 OFFSETTING

Assets, liabilities, revenues and expenses have not been offset except when offsetting is required or permitted by a standard of GRAP.

1.4 STANDARDS, AMENDMENTS TO STANDARDS AND INTERPRETATIONS ISSUED BUT NOT YET EFFECTIVE

Standard number	Standard name	Effective date (if applicable)
GRAP 20	Related party disclosures	01 April 2019
GRAP 32	Service Concession Arrangements: Grantor	01 April 2019
GRAP 34	Separate Financial Statements	No effective date
GRAP 35	Consolidated Financial statements	No effective date
GRAP 36	Investment in Associates and Joint Ventures	No effective date
GRAP 37	Joint Arrangement	No effective date
GRAP 38	Disclosure of Interests in Other Entities	No effective date
GRAP 108	Statutory Receivables	01 April 2019
GRAP 109	Accounting by Principals and Agents	01 April 2019
GRAP 110	Living and Non-living Resources	01 April 2020

GRAP 20 – Related parties

This standard provides the requirements for the disclosure of related parties and transactions and balances with related parties. This standard was based on IPSAS 20 as currently applied by the entity for its related party disclosures. Accordingly the adoption of this standard will only affect the disclosures in the Financial Statement. This standard does not yet have an effective date.

GRAP 32 – Service Concession Arrangements: Grantor

The objective of this Standard is to prescribe the accounting for service concession arrangements by the grantor, a public sector entity. The implementation of the statement will not be applicable to SANSA currently as SANSA is not an operator providing a mandated function related to the service concession asset.

GRAP 34 – Separate Financial Statements

The objective of this Standard is to prescribe the accounting and disclosure requirements for investments in controlled entities, joint ventures and associates when an entity prepares financial statements. The implementation of the statement will not be applicable to SANSA as SANSA does not have investments in controlled entities, joint ventures and investments in associates.

GRAP 35 – Consolidated Financial Statements

The objective of this Standard is to establish principles for presentation and preparation of consolidated financial statements when an entity controls one or more other entities. The implementation of the statement will not be applicable to SANSA as SANSA does not have controlled entities.

ACCOUNTING POLICIES

For the year ended 31 March 2018

GRAP 36 – Investment in Associates and Joint Ventures

The objective of this Standard is to prescribe the accounting for investments in associates and joint ventures and set out the requirements for the application of the equity method when accounting for investments in associates and joint ventures. The implementation of the statement will not be applicable to SANSA currently as SANSA does not have investments and does not have joint ventures.

GRAP 37 – Joint Arrangements

The objective of this Standard is to establish principles for financial reporting by entities that have an interest in arrangements that are jointly controlled . The standard will not have an impact on SANSA as SANSA has no joint control arrangements.

GRAP 38– Disclosure of interest in Other Entities

The objective of this Standard is to require an entity to disclose information that enables users of its financial statements to evaluate: the nature of, and risks associated with, its interests in controlled entities, unconsolidated controlled entities, joint arrangements interest in associates, and structured entities that are not consolidated; and the effects of those interests on its financial position, financial performance and cash flows. The standard will not have an impact on SANSA as SANSA has no interest in other entities.

GRAP 108 Statutory Receivables

The objective of this Standard is to prescribe accounting for the recognition, measurement, presentation and disclosure of statutory receivables. The standard will not have an impact on SANSA as SANSA is a schedule 3A public entity as listed in the PFMA however if SANSA was to be listed as a schedule 3B National Government Business Enterprise it would have to register for VAT and Income Tax and thus the statement will be applicable.

GRAP 109 Accounting by Principals and Agents

The objective of this Standard is to outline principles to be used by an entity to assess whether it is party to a principal-agent arrangement, and whether it is a principal or an agent in undertaking transactions in terms of such an arrangement. This Standard does not introduce new recognition or measurement requirements for revenue, expenses, assets and/or liabilities that result from principal-agent arrangements. The Standard does however provide guidance on whether revenue, expenses, assets and/or liabilities should be recognised by an agent or a principal, as well as prescribe what information should be disclosed when an entity is a principal or an agent.

SANSA has elected to adopt GRAP 109 Accounting by Principals and Agents early to illustrate the impact of early adoption of this statement (see Note 17), no effective date has been determined by the Minister of Finance. The impacts of the early adoption on the Financial Statements of SANSA are disclosed in accounting policy note 1.9.3.2.

GRAP 110 Living and Non-Living Resources

The objective of this Standard is to prescribe accounting for the recognition, measurement, presentation and disclosure of living resources and disclosure requirements for non -living resources. The standard will not have an impact on SANSA as SANSA's operations does not involve dealing with living organisms such as animals and plants.

1.5 PROPERTY, PLANT AND EQUIPMENT

1.5.1 Initial recognition and subsequent measurement

Property, plant and equipment are measured at cost, net of accumulated depreciation and/ or accumulated impairment losses, if any. Property, plant and equipment are tangible assets which are held for use in the production or supply of goods and services or for administrative purposes and are expected to be used during more than one financial period.

ACCOUNTING POLICIES

For the year ended 31 March 2018

The cost of an item of property, plant and equipment is recognised as an asset when:

- It is probable that future economic benefits or service potential associated with the item will flow to the entity; and
- The cost of the item can be measured reliably

Costs include costs incurred initially to acquire or construct an item of property, plant and equipment and significant costs incurred subsequently to add to, replace part of, or service it. If a replacement cost is recognised in the carrying amount of an item of property, plant and equipment, the carrying amount of the replaced part is derecognised. All property, plant and equipment is measured at cost, less depreciation, less impairment subsequent to the initial recognition.

Where an asset is acquired at no cost, (i.e. non-exchange transaction), it's cost will be it's fair value as at the date of acquisition.

All repairs and maintenance costs are recognised in surplus or deficit as incurred. The present value of the initial expected estimate cost for the decommissioning of the asset after its use is included in the cost of the respective asset if the recognition criteria for a allowance is met. When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

1.5.2 Depreciation

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. Depreciation is recognised even if the fair value of the asset exceeds its carrying amount, as long as the asset's residual value does not exceed its carrying amount. Repair and maintenance of an asset do not negate the need to depreciate it. SANSA's accounting policy is to depreciate assets as follows:

a. Freehold land

   Land has an unlimited useful life and therefore is not depreciated but stated at cost

b. Freehold buildings

   SANSA identified the following major components of buildings.

   - Buildings
   - Alterations and other fixtures

   The useful lives of the various components of buildings have been assessed to be:

   - Buildings 15-50 years
   - Alterations and other fixtures 14-15 years

c. Equipment and Motor Vehicles

   The useful lives of the various categories of equipment and vehicles have been assessed to be:

   - Office furniture 3-10 years
   - Motor vehicles 3-10 years
   - Computer equipment 1-10 years
   - Research equipment 2-15 years
   - Property, Plant & Machinery 2-20 years
   - Office Equipment 3-10 years
   - Exhibits 10 years
   - Laboratory Equipment 5 years

ACCOUNTING POLICIES

For the year ended 31 March 2018

d. Leasehold improvements

These improvements are depreciated over the shorter of the contract period or the useful lives of the assets.

In assessing whether there is any indication that the expected useful life of an asset has changed, management considers the following indications

(a) The composition of the asset changed during the reporting period, i.e. the significant components of the asset changed.

(b) The use of the asset has changed, because of the following:

- The entity has changed the manner in which the asset is used.
- The entity has changed the utilisation rate of the asset.
- The entity has made a decision to dispose of the asset in a future reporting period(s) such that this decision changes the expected period over which the asset will be used.
- Technological, environmental, commercial or other changes that occurred during the reporting period that have, or will, change the use of the asset.
- Legal or similar limits placed on the use of the asset have changed.
- The asset was idle or retired from use during the reporting period.
- The asset is approaching the end of its previously expected useful life.

(c) Planned repairs and maintenance on, or refurbishments of, the asset and/or its significant components either being undertaken or delayed.

(d) Environmental factors, e.g. increased rainfall or humidity, adverse changes in temperatures or increased exposure to pollution.

(e) There is evidence that the condition of the asset improved or declined based on assessments undertaken during the reporting period.

(f) The asset is assessed as being impaired in accordance with GRAP 21 and GRAP 26.

In assessing whether there is any indication that the expected residual value of an asset has changed, an entity shall consider whether there has been any change in the expected timing of disposal of the asset, as well as any relevant indicators included above.

Disclosure

The financial statements shall also disclose for each class of property, plant and equipment recognised in the financial statements:

(a) the existence and amounts of restrictions on title and property, plant and equipment pledged as securities for liabilities;

(b) the amount of contractual commitments for the acquisition of property, plant and equipment;

(c) if it is not disclosed separately on the face of the statement of financial performance, the amount of compensation from third parties for items of property, plant and equipment that were impaired, lost or given up that is included in surplus or deficit

An entity shall disclose the following in the notes to the financial statements in relation to property, plant and equipment which is in the process of being constructed or developed:

(a) The cumulative expenditure recognised in the carrying value of property, plant and equipment. These expenditures shall be disclosed in aggregate per class of asset.

(b) The carrying value of property, plant and equipment that is taking a significantly longer period of time to complete than expected, including reasons for any delays.

(c) The carrying value of property, plant and equipment where construction or development has been halted either during the current or previous reporting period(s). The entity shall also disclose reasons for halting the construction or development of the asset and indicate whether any impairment losses have been recognised in relation to these assets.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no future economic benefits or service potential is expected from its use or disposal. The gain or loss arising from the derecognition of an item of property, plant and equipment is included in surplus or deficit when the item is derecognised. 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.

1.5.3 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 primarily held for service delivery purposes.

1.5.3.1 Cash generating assets

The entity assesses at each reporting date whether there is any indication that an asset may be impaired. If any such indication exists, the entity estimates the recoverable amount of the individual asset.

If there is any indication that an asset may be impaired, the recoverable amount is estimated for the individual asset. 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.

A cash generating unit is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets.

The recoverable amount of an asset or a cash-generating unit is the higher of its fair value less costs to sell and its value in use.

If the recoverable amount of an asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. That reduction is an impairment loss.

An impairment loss of assets carried at cost less any accumulated depreciation or amortisation is recognised immediately in surplus or deficit.

An impairment loss is recognised for cash-generating units if the recoverable amount of the unit is less than the carrying amount of the unit. The impairment loss is allocated to reduce the carrying amount of the assets of the unit as follows:

- to the assets of the unit, pro rata on the basis of the carrying amount of each asset in the unit

An entity assesses at each reporting date whether there is any indication that an impairment loss recognised in prior periods for assets may no longer exist or may have decreased. If any such indication exists, the recoverable amounts of those assets are estimated and the carrying amount is increased to the recoverable amount.

The increased carrying amount of an asset attributable to a reversal of an impairment loss should not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods.

A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation is recognised immediately in surplus or deficit.

ACCOUNTING POLICIES

For the year ended 31 March 2018

1.5.3.2 Non-Cash generating assets

The entity assesses at each reporting date whether there is any indication that an asset may be impaired. If any such indication exists, the entity estimates the recoverable service amount of the asset.

The recoverable service amount is the higher of a non-cash generating asset's fair value less costs to sell and its value in use. The value in use for a non-cash generating asset is the present value of the asset's remaining service potential.

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 is recognised in surplus/deficit.

An impairment loss is recognised for non cash-generating units if the recoverable service amount of the unit is less than the carrying amount of the unit. The impairment loss is allocated to reduce the carrying amount of the assets of the unit as follows:

- to the assets of the unit, pro rata on the basis of the carrying amount of each asset in the unit.

An entity assesses at each reporting date whether there is any indication that an impairment loss recognised in prior periods for assets may no longer exist or may have decreased. If any such indication exists, the recoverable service amounts of those assets are estimated and increases the carrying amount to the recoverable service amount.

The increased carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods.

A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation is recognised immediately in surplus or deficit.

1.6 INTANGIBLE ASSETS

An intangible asset is recognised when:

- It is probable that the expected future economic benefits or service potential that are attributable to the asset will flow to the entity; and
- The cost of the asset can be measured reliably.

Intangible assets are initially recognised at cost.

Expenditure on research (or on the research phase of an internal project) is recognised in surplus or deficit when it is incurred.

An intangible asset arising from development (or from the development phase of an internal project) is recognised when:

Subsequent expenditure is capitalised only when it increases the future economic benefits embodied in the asset to which it relates. The amortisation is calculated at a rate considered appropriate to reduce the cost of the asset less residual value over the shorter of its estimated useful life or contractual period. Residual values and estimated useful lives are reviewed annually. The amortisation method used is the straight line method. Intangible assets that meet the recognition criteria are stated in the statement of financial position at amortised cost, being the initial cost price less any accumulated amortisation and impairment losses. The assets residual values, useful lives and methods of amortisation are reviewed at each financial year end, and adjusted prospectively if appropriate. 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:

Computer Software : 3 years

An item of intangible assets is derecognised upon disposal or when no future economic benefits or service potential are expected from its use or disposal. The surplus or deficit arising from the derecognition of an item of intangible assets is included in the surplus or deficit when the item is derecognised. 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.

1.7 FINANCIAL INSTRUMENTS

The entity has various types of financial instruments and these can be broadly categorised as either financial assets, financial liabilities or equity instruments in accordance with the substance of the contractual agreement .

1.7.1 Initial recognition

Financial assets and financial liabilities are recognised on the entity's Statement of Financial Position when the entity becomes party to the contractual allowances of the instrument, therefore trade date accounting applies.

The entity does not offset a financial asset and a financial liability unless a legally enforceable right to set off the recognised amounts currently exists; and the entity intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

1.7.2 Financial Assets - Classification

A financial asset is any asset that is cash or a contractual right to receive cash or another financial assets.

The financial assets of the entity are classified as Financial instruments at amortised cost.

The Financial assets are carried at cost are investments in residual interests that do not have a quoted market price in an active market, thus fair value cannot be reliably measured.

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
Bank Balances and Cash	Financial instruments at amortised cost
Trade receivables	Financial instruments at amortised cost

Cash includes cash on hand (including petty cash) and cash with banks. Cash equivalents are short-term highly liquid investments, readily convertible into known amounts of cash, that are held with registered banking institutions with maturities of three months or less and are subject to an insignificant risk of change in value. For the purposes of the cash flow statement, cash and cash equivalents comprise cash on hand, deposits held on call with banks, net of bank overdrafts.

Trade receivables consists of amounts due by customers.

1.7.3 Financial Liabilities - Classification

A financial liability is a contractual obligation to deliver cash or another financial asset to another entity. 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 liability	Classification
Trade and other payables	Financial instruments at amortised cost

ACCOUNTING POLICIES

For the year ended 31 March 2018

1.7.4 Initial and Subsequent Measurement

Financial Assets:

Financial Assets (upon initial recognition) are stated at fair value, plus transaction costs that are directly attributable to the acquisition or issue of the financial asset. Subsequent to initial recognition, financial assets are measured at amortised cost.

Financial liabilities:

Financial Liabilities (upon initial recognition) are stated at fair value, plus transaction costs that are directly attributable to the acquisition or issue of the financial liabilities. Subsequent to initial recognition, financial liabilities are measured at amortised cost

1.7.5 Impairment of Financial Assets

Financial assets, other than those at fair value, are assessed for indicators of impairment at the end of each reporting period. 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). If there is such evidence the recoverable amount is estimated and an impairment loss is recognised.

Financial assets carried at amortised cost

Financial assets 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.

When a debtor is considered uncollectible, it is written off. Changes in the carrying amount of the allowance account are recognised in the Surplus/Deficit.

1.7.6 Derecognition of Financial Assets

The entity derecognises financial assets only when the contractual rights to the cash flows from the asset expire or it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity. The entity transfers a financial asset if either it transfers the contractual rights to receive the cash flows of the financial asset or retains the contractual rights to receive the cash flows of the financial asset.

1.7.7 Derecognition of Financial Liabilities

The entity derecognises financial liabilities when, and only when, the entity's obligations are discharged, cancelled or they expire.

The entity recognises the difference between the carrying amount of the financial liability (or part of a financial liability) extinguished or transferred to another party and the consideration paid, including any non-cash assets transferred or liabilities assumed, in surplus or deficit.

ACCOUNTING POLICIES

For the year ended 31 March 2018

1.8 RISK MANAGEMENT OF FINANCIAL ASSETS AND LIABILITIES

It is the policy of the entity to disclose information that enables the user of its financial statements to evaluate the nature and extent of risks arising from financial instruments to which the entity is exposed on the reporting date.

The entity has exposure to the following risks from its use of financial instruments:

- market risk
- credit risk
- liquidity risk

Risks and exposure are disclosed as follows:

Market Risk

Market risk is the risk that changes in market prices, such as foreign exchange rates, interest rates and equity prices will affect the entity's income or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimising the return.

Credit Risk

Credit risk is the risk of financial loss to the entity if a customer or counterparty to a financial instrument fails to meet its contractual obligations, and arises principally from the entity's receivables from customers and investment securities.

Each class of financial instrument is disclosed separately. The maximum exposure to credit risk not covered by collateral is specified, and financial instruments covered by collateral are specified.

Liquidity Risk

Liquidity risk is the risk that the entity will encounter difficulty in meeting the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Entity's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due, under both normal and stressed conditions, without incurring unacceptable losses or risking damage to the entity's reputation.

Liquidity risk is managed by ensuring that all assets are reinvested at maturity at competitive interest rates in relation to cash flow requirements. Liabilities are managed by ensuring that all contractual payments are met on a timeous basis and, if required, additional new arrangements are established at competitive rates to ensure that cash flow requirements are met.

1.9 REVENUE RECOGNITION

1.9.1 General

Revenue, is derived from a variety of sources which includes government grants, rendering of services and finance income.

Revenue comprises the fair value of the consideration received or receivable for services rendered in the ordinary course of the entity's activities. Revenue is shown net of rebates and discounts.

The entity recognises revenue when the amount of revenue can be reliably measured, it is probable that future economic benefits will flow to the entity and when specific criteria have been met for each of the entity's activities as described below. The amount of revenue is not considered to be reliably measurable until all contingencies relating

ACCOUNTING POLICIES

For the year ended 31 March 2018

to the sale have been resolved. The entity bases its estimates on historical results, taking into consideration the type of customer, the type of transaction and the specifics of each arrangement.

1.9.2 Revenue from Exchange Transactions

Revenue from exchange transactions refers to revenue that accrued to the entity directly in return for services rendered, the value of which approximates the consideration received or receivable.

1.9.2.1 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.

1.9.2.2 Rendering of Services

Rendering of Services constitute revenue which arises from service delivery to customers.

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.

The stage of completion is assessed by reference to work performed as at reporting date. 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.

1.9.3 Revenue from Non-exchange Transactions

Revenue from non-exchange transactions refers to transactions where the entity received revenue from another entity without directly giving approximately equal value in exchange. Revenue from non-exchange transactions is generally recognised to the extent that the related receipt or receivable qualifies for recognition as an asset and there is no liability to repay the amount.

1.9.3.1 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 any 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.

1.9.3.2 Government grants/subsidies

Liability held on behalf of principal

Income received from conditional grants where SANSA is acting as an agent rather than as a principal, SANSA as agent

recognises only that portion of the revenue and expenses it receives or incurs in executing the transactions on behalf of the principal

An entity is an agent when, in relation to transactions with third parties, when all three of the following criteria are present,

(a) It does not have the power to determine the significant terms and conditions of the transaction.

(b) It does not have the ability to use all, or substantially all, of the resources that result from the transaction for its own benefit.

(c) It is not exposed to variability in the results of the transaction.

1.10 LEASES

Lease Classification

Leases of property, plant and equipment, in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases.

Leases are classified as finance leases where substantially all the risks and rewards associated with ownership of an asset are transferred to the entity.

The Entity as Lessee

Determining whether an arrangement contains a lease

At inception of an arrangement, the entity determines whether such an arrangement is or contains a lease. A specific asset is the subject of a lease if fulfilment of the arrangement is dependent on the use of that specified asset. An arrangement conveys the right to use the asset if the arrangement conveys to the entity the right to control the use of the underlying asset. At inception or upon reassessment of the arrangement, the entity separates payments and other consideration required by such an arrangement into those for the lease and those for other elements on the basis of their relative fair values. If the entity concludes for a finance lease that it is impracticable to separate the payments reliably, an asset and a liability are recognised at an amount equal to the fair value of the underlying asset. Subsequently the liability is reduced as payments are made and an imputed finance charge on the liability is recognised using the entity's incremental borrowing rate.

Finance leases

Where the entity enters into a finance lease, Property, plant and equipment or Intangible Assets subject to finance lease agreements are capitalised at amounts equal to the fair value of the leased asset or, if lower, the present value of the minimum lease payments, each determined at the inception of the lease. Corresponding liabilities are included in the Statement of Financial Position as Finance Lease Liabilities. The corresponding liabilities are initially recognised at the inception of the lease and are measured as the sum of the minimum lease payments due in terms of the lease agreement, discounted for the effect of interest. In discounting the lease payments, the entity uses the interest rate that exactly discounts the lease payments and unguaranteed residual value to the fair value of the asset plus any direct costs incurred. Lease payments are allocated between the finance cost and capital repayment using the effective interest rate method. Finance costs are expensed when incurred.

Subsequent to initial recognition, the leased assets are accounted for in accordance with the stated accounting policies applicable to property, plant, equipment or intangibles. The lease liability is reduced by the lease payments, which are allocated between finance cost and capital repayment using the effective interest rate method. Lease finance costs are expensed when incurred. The accounting policies relating to DE recognition of financial instruments are applied to lease payables. The lease asset is depreciated over the shorter of the asset's useful life or the lease term.

ACCOUNTING POLICIES

For the year ended 31 March 2018

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

1.11 RELATED PARTIES

Individuals as well as their close family members, and/or entities are related parties if one party has the ability, directly or indirectly, to control or jointly control the other party or exercise significant influence over the other party in making financial and/or operating decisions. SANSA is a related entity to all other entities (and their controlled / jointly controlled entities) for which the Minister of Science and Technology is the executive authority and more broadly, to all entities controlled by the national executive.

1.12 EVENTS AFTER THE REPORTING DATE

Events after the reporting date that are classified as adjusting events have been accounted for in the Annual Financial Statements. Events after the reporting date that are classified as non-adjusting events have been disclosed in the notes to the Annual Financial Statements.

1.13 COMPARATIVE INFORMATION

Prior year comparatives

When the presentation or classification of items in the Annual Financial Statements is amended, prior period comparative amounts are reclassified. The nature and reasons for the reclassification are disclosed.

1.14 CAPITAL COMMITMENTS AND EXPENDITURE

Items are classified as commitments where the entity commits itself to future transactions that will normally result in the outflow of resources.

Capital commitments are not recognised in the statement of financial position as a liability but are included in the disclosure notes in the following cases:

- Approved and contracted commitments, where the expenditure has been approved and the contract has been awarded at the reporting date, where disclosure is required by a specific standard of GRAP.

1.15 CONTINGENT LIABILITIES

Contingent liabilities represent a possible obligation that arises from past events and whose existence will be confirmed only by an occurrence or non-occurrence of one or more uncertain future events not wholly within the control of the entity.

1.16 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.

Foreign currency translation

(a) Functional and presentation currency

Items included in the financial statements are measured using the currency of the primary economic environment in which the entity operates ('the functional currency'). Financial Statements are presented in South African Rends, which is the company's functional and presentation currency.

(b) Transactions and Balances

Foreign currency transactions are translated into the functional currency using the exchange rates prevailing at the date of the transaction. Foreign exchange gains and losses resulting from the settlement of such transactions, and from the translation of monetary assets and liabilities denominated in foreign currencies at year end are recognised in the Statement of Financial Position.

1.17 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.

1.18 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.

1.19 EMPLOYEE BENEFITS

1.19.1 Short-term Employee Benefits

Remuneration to employees is recognised in the Statement of Financial Performance as the services are rendered, except for non-accumulating benefits, which are only recognised when the specific event occurs.

The entity treats its provision for leave pay as an accrual.

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.

1.20 Provisions

Provisions are recognised when the entity has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources embodying economic benefits or service potential will be required to settle the obligation and a reliable estimate can be made.

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.

1.21 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.

ACCOUNTING POLICIES

For the year ended 31 March 2018

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.

1.22 TRANSFER OF FUNCTIONS UNDER COMMON CONTROL

If a transfer of functions between entities within the same sphere of government or between entities that are part of the same economic entity the transfer is considered to have occurred between entities under common control. Assets and liabilities transferred between entities under common control are recognised at the carrying values. In instances where the carrying amount is not available or can't be accurately determined, the depreciated replacement cost is used as the deemed carrying amount.

1.23 BUDGET INFORMATION

The Financial Statements and budget are not presented on the same basis, 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.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

2. 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 Technology
Board members	Ms. J Lawrence (Chairperson) Prof. R Bharuthram Mr. V Gore Mr. S Hamilton Mr. E Jansen Ms. G Khambule Mr. P Maine Ms. M Matooane Ms. M Mfeka Dr. N Mjoli Dr. V Munsami (Chief Executive Officer) Mr. A Naidoo Mr. J Prinsloo Ms. I Pule Mr. M Rezelman Mr. M Riba Mr. W Van Biljon
Registered office	Enterprise Building, Mark Shuttleworth street, Innovation Hub Pretoria Gauteng, South Africa
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 Technopak, Centurion

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

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 administration 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 administration programme for reporting purposes. It is not an operation on its own but a business unit within the administration programme overseeing key projects across the divisions.

The Administration 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 directorates.

The 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 Observation 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 basic 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 primary science advancement and learner and educator space science 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.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

2018	Administration Office & Space Engineering	Earth Observation	Space Operations	Space Science	Eliminations	Total
	R	R	R	R	R	R
REVENUE						
Revenue from Non - Exchange Transactions						
Transfers and Subsidies Received	120 015 192	65 100 991	-	33 835 199		**218 951 382**
Revenue from Exchange Transactions						
Interest Income	6 739 834	232 253	1 025 646	312 800		**8 310 533**
Rendering of Services	-	7 528 680	69 971 699	10 309 996		**87 810 375**
Other Income	3 041 046	4 255 802	14 967 720	373 403	(17 861 960)	**4 776 010**
Total Revenue	**129 796 072**	**77 117 727**	**85 965 065**	**44 831 398**	**(17 861 960)**	**319 848 300**
Expenditure						
Employee Related Costs	31 163 626	23 230 175	31 748 543	24 332 468		**110 474 811**
Board Member Remuneration	1 170 199	-	-	-		**1 170 199**
Depreciation and Amortisation	899 371	8 574 752	10 809 375	5 116 028		**25 399 526**
Repairs and Maintenance	572 473	2 319 891	6 145 540	1 495 642		**10 533 545**
Finance Costs	-	-	-	-		**-**
Data Licence fees	-	34 451 213	-	-		**34 451 213**
Student Bursaries and Research Grants Paid	1 339 805	1 584 360	-	2 696 628		**5 620 792**
Antenna Infrastructure Services	-	-	3 270 496	-		**3 270 496**
Training Expenses	387 445	302 009	361 806	175 114		**1 226 374**
General Expenses	16 785 484	22 991 295	19 050 156	7 631 602	(17 861 960)	**48 596 577**
Net Losses on foreign exchange transactions	1 297	862 611	1 037 373	(40 236)		**1 861 044**
Loss on Disposal of Property, Plant and Equipment	30 219	1 702	4 540	59 647		**96 109**
Bad debts	8 916	-	-	-	-	**8 916**
Total Expenditure	**52 349 919**	**94 318 008**	**72 427 827**	**41 466 892**	**(17 861 960)**	**242 709 601**
Surplus (Deficit) for the year	**77 446 152**	**(17 200 280)**	**13 537 238**	**3 364 505**	**-**	**77 138 699**
Assets						
Non-current - Segment assets	323 208 886	12 132 735	82 100 173	30 076 915	-	**447 518 708**
Current - Segment assests	82 013 639	4 256 519	29 981 849	6 873 419	-	**123 125 426**
Total Segment assets	**405 222 523**	**16 389 254**	**112 082 021**	**36 950 333**	**-**	**570 644 134**
Liabilities						
Non - current Segment Liabilities	-	-	-	-		**-**
Current Segment Liabilities	(260 561 296)	217 603 660	7 306 755	59 731 259	62 121 113	**86 201 490**
Total Segment Liabilities	**(260 561 296)**	**217 603 660**	**7 306 755**	**59 731 259**	**62 121 113**	**86 201 490**
Non cash items excluding depreciation						
Accrued expenses	**899 962**	**1 793 358**	**909 189**	**1 171 189**	**-**	**4 773 698**
Deferred revenue		**6 269 859**	**-**	**732 331**	**-**	**7 002 191**

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

2017	Administration Office & Space Engineering	Earth Observation	Space Operations	Space Science	Eliminations	Total
	R	R	R	R	R	R
REVENUE						
Revenue from Non - Exchange Transactions						
Transfers and Subsidies Received	134 884 081	62 678 631	-	29 670 026		**227 232 738**
Revenue from Exchange Transactions						
Interest Income	8 165 801	815 722	164 406	432 704		**9 578 633**
Rendering of Services	-	10 304 616	52 653 295	8 806 902		**71 764 813**
Other Income	1 699 326	175 791	14 082 973	1 220 934	(15 343 565)	**1 835 459**
Total Revenue	**144 749 208**	**73 974 760**	**66 900 674**	**40 130 566**	**(15 343 565)**	**310 411 643**
Expenditure						
Employee Related Costs	27 264 397	23 337 493	31 231 084	22 862 526		**104 695 500**
Board Member Remuneration	1 069 887	-	-	-		**1 069 887**
Depreciation and Amortisation	1 362 128	8 357 660	9 725 172	4 433 370		**23 878 330**
Repairs and Maintenance	274 944	2 473 603	3 677 254	1 009 648		**7 435 449**
Finance Costs	24 339	-	-	-		**24 339**
Data Licence fees	-	36 124 088	-	-		**36 124 088**
Grants and Subsidies Paid	927 500	1 445 100	-	3 080 193		**5 452 793**
Antenna Infrastructure Services	-	-	203 266	-		**203 266**
Training Expenses	1 036 187	319 919	150 574	213 343		**1 720 023**
General Expenses	17 296 065	17 353 807	15 888 276	7 175 772	(15 343 565)	**42 370 355**
Net Losses on foreign exchange transactions	154 563	(6 761)	1 321 073	(116 858)		**1 352 017**
Loss on Disposal of Property, Plant and Equipment	36 306	-	314 394	213 908		**564 608**
Total Expenditure	**49 446 316**	**89 404 909**	**62 511 094**	**38 871 902**	**(15 343 565)**	**224 890 656**
Surplus (Deficit) for the year	**95 302 892**	**(15 430 149)**	**4 389 580**	**1 258 664**	**-**	**85 520 987**
Assets						
Non-current - Segment assets	246 622 192	18 731 143	70 578 727	28 882 183		**364 814 245**
Current - Segment assets	309 540 697	23 699 164	25 463 857	11 130 061	(197 812 185)	**172 021 594**
Total Segment assets	**556 162 889**	**42 430 307**	**96 042 584**	**40 012 244**	**(197 812 185)**	**536 835 839**
Liabilities						
Non - current Segment Liabilities	-	-	-	-		**-**
Current Segment Liabilities	99 836 534	154 651 891	5 212 221	67 643 434	(197 812 185)	**129 531 895**
Total Segment Liabilities	**99 836 534**	**154 651 891**	**5 212 221**	**67 643 434**	**(197 812 185)**	**129 531 895**
Capital expenditure	**91 370 622**	**247 363**	**16 023 356**	**2 483 037**	**-**	**110 124 378**
Non cash items excluding depreciation						
Accrued expenses	**2 016 383**	**3 231 235**	**432 104**	**277 751**	**-**	**5 957 473**
Deferred revenue	**-**	**361 065**	**5 953 053**	**1 010 377**	**-**	**7 324 495**

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

	2018 R	2017 R
Revenue from Non-exchange Transactions		
Gauteng Province		
Administration	120 015 192	134 884 081
Earth Observation	65 100 991	62 678 631
Space Operations	-	-
	185 116 182	**197 562 712**
Western Cape Province		
Space Science	33 835 199	29 670 026
Total Revenue from Non-exchange Transactions	**218 951 382**	**227 232 738**
Revenue from Exchange Transactions		
Gauteng Province		
Administration	9 780 880	9 865 127
Earth Observation	12 016 737	11 296 129
Space Operations	85 965 065	66 900 674
	107 762 682	**88 061 930**
Western Cape Province		
Space Science	10 996 199	10 460 540
Total Revenue from Exchange Transactions	**118 758 880**	**98 522 470**
Segment Expenditure		
Gauteng Province		
Administration	52 349 919	49 446 316
Earth Observation	94 318 008	89 404 909
Space Operations	72 427 827	62 511 094
	219 095 754	**201 362 319**
Western Cape Province		
Space Science	41 466 892	38 871 902
Total Segment Expenditure	**260 562 646**	**240 234 221**
Non - Current Segment Assets		
Gauteng Province		
Administration	323 208 886	246 622 192
Earth Observation	12 132 735	18 731 143
Space Operations	82 100 173	70 578 727
	417 441 794	**335 932 062**
Western Cape Province		
Space Science	30 076 915	28 882 183
Total Non - Current Segment Assets	**447 518 709**	**364 814 244**

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

4. STATEMENT OF COMPARISION 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 the accrual basis.

4.2 The budget is approved on a cash basis by functional classification as well as economic classification. The approved budget covers the fiscal period from 1 April 2017 to 31 March 2018. The budget and the accounting bases differ. The Financial Statements for the entity are prepared on the accrual basis using a classification based on the nature of expenses in the Statement of Financial Performance. The Financial Statements differ from the budget, which is approved on the cash basis. The Statement of Comparison of Budget and Actual Amounts is prepared on a comparable basis to the budget. The reconciliation of the actual comparable amounts to the net cash flows per the Cash Flow Statement is presented on the Statement of Comparison of Budget and Actual Amounts. The difference between the approved budget and final budget is to take into account additional revenues and transfers confirmed post budget approval, the carry over of approved cash surpluses as a result of prior year commitments and the any reprioritisation of funds between expenditure categories.

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

4.3.1 The favourable variance of R20.9 million on ring fenced transfers is as a result of funds received in the fourth quarter for the Earth observation data infrastructure project. The project will commence in the 2018/19 financial year.

4.3.2 The favourable variance against budget on research grants of R1.5 million is due to additional research grants awarded which were not included in the original and revised budget estimates.

4.3.3 The R13.9 million favourable on revenue from exchange transactions is mainly due to additional foreign income earned by Space Operations divisions due to the increase in the number of launches and in orbit tests supported during the fourth quarter, which were not anticipated during the budgeting process.

4.3.4 The variance of R2.554 million is mainly due to additional interest income earned on bank account balances as well as additional ISRSE conference fees earned over and above the final budget estimates.

4.3.5 The underspend variance on compensation on compensation of employees is mainly due to vacancies that had materialised during the year due to resignations of 3 key management positions in the prior year which were unfilled for most of the current financial year. There were also further resignations at management and practitioner level which were not filled due to financial constraints.

4.3.6 The underspend variance on goods and services mainly consists of repairs and maintenance items on order not yet delivered, which normally have long delivery lead times.

4.3.7 The underspend variance on machinery and equipment relates to capital equipment on order but not yet delivered as well as items already in the procurement process. Most of the equipment is sourced internationally for both the space operations ground infrastructure and research equipment.

4.3.8 The underspend variance on software and intangible assets is mainly due to the delayed go live date on the SAGE ERP implementation project.

4.3.9 The variance on the satellite programme is mainly due to the internal labour component of the cost not included in the capital budget line item, however the spend is within the funds available. See note 16.1.1 for the grant breakdown of the satellite programme.

5. CASH AND CASH EQUIVALENTS

	2018 R	2017 R
Cash and Cash Equivalents	97 223 484	150 757 680
Total Cash and Cash Equivalents	**97 223 484**	**150 757 680**

Cash and cash equivalents are measured at amortised cost. Cash includes cash on hand and cash with banks.

5.1 ANALYSIS OF CASH AND CASH EQUIVALENTS BALANCE

Cash in Bank for operational requirements[1]	39 131 505	54 669 031
Cash in the Bank held on behalf of principal[2]	-	9 268 569
Cash in Bank held for Committed Conditional Grants[3]	58 087 679	86 815 945
Total Cash in Bank Accounts	**97 219 185**	**150 753 545**

5.2 CASH ON HAND

Cash on hand	4 299	4 135
Total Cash on Hand	**4 299**	**4 135**
Total Cash and Cash equivalents	97 223 484	150 757 680

[1] Cash held for operational requirements represents cash to be utilised to settle trade and other payables R21m (2017: R20m) which are due in 30 days, provision for performance bonus R6.1m (2017: R7.6m) and the balance (R12m) for commitment items on order but not yet delivered.

[2] Cash held on behalf of the principal in 2017 was for the grant awarded to the Cape Peninsula University of Technology for the Cube Satellite Constellation project.

[3] Cash in the bank held for committed conditional grants to cover the Satellite development programme of R4m (2017: R48.9m); Operation Phakisa Data acquisition and Ocean and Coast Information management system of R26.6m (2017: R26.6 m); Assembly Integration and Test Facilities of R4.7m (2017:R6.5m); Earth Observation Data Infrastructure Center of R20.9m (2017:Rnil); Post graduate support programme of R1.1m (2017: R2.3m) and Research grants of R0.7m (2017:R2.5m). Refer to note 16.1 to 16.3.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

6. RECEIVABLES FROM EXCHANGE TRANSACTIONS

	2018 R	2017 R
Trade receivables	21 673 774	11 160 159
Other receivables	3 720 050	9 640 480
	25 393 824	**20 800 639**

6.1 TRADE RECEIVABLES

As at 31 March 2018	Gross	Allowance for Impairment	Net
Trade debtors	21 673 774	-	21 673 774
Total	**21 673 774**	**-**	**21 673 774**

As at 31 March 2017	Gross	Allowance for Impairment	Net
Trade debtors	11 160 159	-	11 160 159
Total	**11 160 159**	**-**	**11 160 159**

6.1.1 AGEING OF TRADE RECEIVABLES

	2017 R	2017 R
Current:		
0 - 30 days	20 833 770	10 850 646
Past Due:		
31 - 60 Days	750 531	119 139
61 - 90 Days	12 200	7 400
91 - 120 Days	77 272	182 974
Total	**21 673 774**	**11 160 159**

6.1.2 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:

	2017 R	2017 R
Trade customers - current	20 833 770	10 850 646

6.1.3 TRADE RECEIVABLES - PAST DUE AND NOT IMPAIRED

Trade receivables that are outside their normal payment terms are considered to be past due. The following represents an analysis of the past due financial assets that are past due but not impaired as these customers paid subsequent to year end:

		2017
	R	R
Trade customers - past due and not impaired	**840 003**	**309 513**
Receivables from Local debtors	4 732 095	1 425 038
Receivables from International debtors	16 941 678	9 735 121
Total Trade Debtors	**21 673 774**	**11 160 159**

6.2 OTHER RECEIVABLES

As at 31 March 2018	Gross	Allowance for Impairment	Net
Prepaid expenses[1]	1 484 490	-	1 484 490
Deposits [2]	2 123 281	-	2 123 281
Other Debtors	112 279	-	112 279
Total	**3 720 050**	**-**	**3 720 050**

As at 31 March 2017	Gross	Allowance for Impairment	Net
Prepaid expenses	7 510 433	-	7 510 433
Deposits	2 037 808	-	2 037 808
Other Debtors	92 239	-	92 239
Total	**9 640 480**	**-**	**9 640 480**

[1]Prepaid expenses consist of advance payments on projects with such contractual arrangements. The major prepayments are for annual licences R0.846m for ICASA and R0.447m for online annual journal subscriptions

[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 mainly in government and international customers mainly from the US and Europe that are in the space industry. Trade receivables are non-interest bearing and are generally on 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 prepayments and 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.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

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 individually for impairment and where impairment is identified, these are disclosed as an allowance for impairment under trade customers.

The credit quality of trade receivables that are neither past due nor impaired are considered as such by the entity taking into account the contract arrangements with these customers and their payment history.

6.4 FAIR VALUE OF TRADE AND OTHER RECEIVABLES

Trade and other receivables from exchange transactions (upon initial recognition) are stated at fair value, plus transaction costs that are directly attributable to the acquisition or issue of the financial asset. Subsequent to initial recognition, financial assets are measured at amortised cost.

Management considers the carrying amounts of financial assets recorded at amortised cost in the financial statements to approximate their fair values on 31 March 2018, as a result of the short-term maturity of these assets and liabilities.

6.5 CLASSIFICATION OF FINANCIAL ASSETS

The Financial Assets of the entity are classified as follows:

Financial Assets	**Classification**	**Carrying amount**	
		2018	**2017**
		R	**R**
Cash and Cash Equivalents			
Cash and cash equivalents	At amortised cost	97 223 484	150 757 680
Trade receivables			
Trade receivables	At amortised cost	21 673 774	11 160 159
Other receivables			
Deposits	At amortised cost	2 123 281	2 037 808
Other Debtors	At amortised cost	112 279	92 239

7. INVENTORY

	2018	**2017**
	R	**R**
Fuel	508 117	463 275
Total Inventory	**508 117**	**463 275**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

For the year ended 31 March 2018

8. PROPERTY, PLANT AND EQUIPMENT

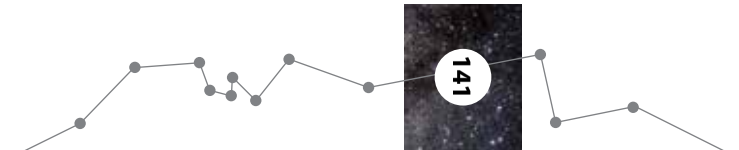
31 March 2018

Description	Land	Leasehold Improvements	Leased Assets	Buildings	Plant and Machinery	Research Equipment	Vehicles	Office Equipment	Furniture and Fittings	Computer Equipment	Exhibits	Work In Progress	Laboratory equipment	Total
	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Carrying values at 1 April 2017	**4 307 700**	**39 960**	**218**	**11 595 329**	**59 263 996**	**7 518 572**	**4 410 560**	**2 161 501**	**3 648 683**	**12 335 489**	**233 152**	**237 717 183**	**1 482 370**	**344 714 713**
Cost	4 307 700	1 700 946	328 387	13 876 324	98 407 045	18 035 835	6 964 535	8 078 896	6 040 492	36 250 015	388 800	237 717 183	2 315 076	434 411 235
Completed Assets	4 307 700	1 700 946	328 387	13 876 324	98 407 045	18 035 835	6 964 535	8 078 896	6 040 492	36 250 015	388 800	-	2 315 076	196 694 053
Under construction	-	-	-	-	-		-	-	-	-	-	237 717 183	-	237 717 183
Accumulated Depreciation	-	(1 660 986)	(328 169)	(2 280 995)	(39 143 049)	(10 517 263)	(2 553 975)	(5 917 395)	(2 391 809)	(23 914 526)	(155 648)	-	(832 706)	(89 696 521)
Acquisitions	**-**	**-**	**-**	**-**	**20 637 303**	**2 714 230**	**874 999**	**33 645**	**365 455**	**6 038 471**	**-**	**74 809 784**	**988 402**	**106 462 290**
Acquisitions at cost	-	-	-	-	20 637 303	2 714 230	874 999	33 645	365 455	6 038 471	-		988 402	31 652 506
Under construction	-	-	-	-	-	-	-	-	-	-	-	74 809 784	-	74 809 784
Depreciation		**(16 670)**	**-**	**(420 795)**	**(8 480 839)**	**(2 601 883)**	**(461 020)**	**(409 357)**	**(600 942)**	**(5 179 328)**	**(41 280)**	**-**	**(530 906)**	**(18 743 020)**
Disposals	**-**	**-**	**-**	**-**	**(43 698)**	**(4 148)**	**(533 335)**	**(3 529)**	**(5 671)**	**(419 748)**	**-**	**-**	**-**	**(1 010 131)**
Disposals at cost	-	-	-	-	(43 698)	(13 306)	(674 695)	(10 458)	(24 293)	(1 681 849)	-		-	(2 448 300)
Accumulated Depreciation	-	-	-	-	-	9 158	141 360	6 929	18 623	1 262 101	-	-	-	1 438 170
Carrying values at 31 March 2018	**4 307 700**	**23 290**	**218**	**11 174 534**	**71 376 762**	**7 626 722**	**4 291 203**	**1 782 246**	**3 407 502**	**12 774 790**	**191 871**	**312 526 966**	**1 939 867**	**431 423 674**
Cost	4 307 700	1 700 946	328 387	13 876 324	119 000 650	20 736 760	7 164 838	8 102 083	6 381 654	40 606 637	388 800	312 526 967	3 303 478	538 425 225
Completed Assets	4 307 700	1 700 946	328 387	13 876 324	119 000 650	20 736 760	7 164 838	8 102 083	6 381 654	40 606 637	388 800		3 303 478	225 898 257
Under construction	-	-	-	-	-	-	-	-	-	-	-	312 526 967		312 526 967
Accumulated Depreciation	-	(1 677 655)	(328 169)	(2 701 790)	(47 623 888)	(13 110 038)	(2 873 635)	(6 319 837)	(2 974 152)	(27 831 848)	(196 928)		(1 363 612)	(107 001 551)

8. PROPERTY, PLANT AND EQUIPMENT (cont.)

31 March 2017

Description	Land	Leasehold Improve-ments	Leased Assets	Buildings	Plant and Machinery	Research equipment	Vehicles	Office equipment	Furniture and fittings	Computer equipment	Exhibits	Work In Progress	Laboratory equipment	Total
	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Carrying values at 1 April 2016	**4 307 700**	**58 797**	**218**	**12 252 245**	**60 354 508**	**8 740 802**	**4 782 464**	**2 566 936**	**2 868 305**	**13 827 587**	**274 432**	**146 281 349**	**1 566 245**	**257 881 588**
Cost	4 307 700	1 700 946	328 387	14 230 505	91 863 596	17 140 219	6 964 535	8 044 225	4 813 983	33 621 553	388 800	146 281 349	1 975 005	331 660 803
Completed assets	4 307 700	1 700 946	328 387	14 230 505	91 863 596	17 140 219	6 964 535	8 044 225	4 813 983	33 621 553	388 800	-	1 975 005	185 379 455
Under construction	-			-		-	-	-	-	-	-	146 281 349		146 281 349
Accumulated Depreciation:	-	(1 642 149)	(328 169)	(1 978 260)	(31 509 088)	(8 399 417)	(2 182 070)	(5 477 290)	(1 945 678)	(19 793 967)	(114 368)	-	(408 760)	(73 779 215)
Acquisitions	**-**	**-**	**-**	**-**	**6 682 315**	**1 719 429**	**-**	**69 433**	**1 295 093**	**2 960 863**	**-**	**91 435 834**	**340 071**	**104 503 038**
Acquisitions at cost	-				6 682 315	1 719 429	-	69 433	1 295 093	2 960 863	-		340 071	13 067 204
Capital under Construction - Additions												91 435 834	-	91 435 834
Depreciation	**-**	**(18 837)**	**0**	**(442 440)**	**(7 682 299)**	**(2 347 423)**	**(371 905)**		**(478 320)**	**(4 370 562)**	**(41 280)**	**-**	**(423 946)**	**(16 177 013)**
Carrying value of Disposals:	**-**	**-**	**-**	**(214 476)**	**(90 528)**	**(594 236)**	**-**	**(10 779)**	**(36 395)**	**(82 398)**	**-**	**-**	**-**	**(1 028 812)**
Cost of disposed asset				-354 181	(138 866)	(823 813)		(34 762)	(68 584)	(332 401)				(1 752 607)
Accumulated depreciation				139 705	48 338	229 577		23 983	32 189	250 003				723 795
Carrying values at 31 March 2017	**4 307 700**	**39 960**	**218**	**11 595 329**	**59 263 996**	**7 518 572**	**4 410 560**	**2 161 501**	**3 648 683**	**12 335 489**	**233 152**	**237 717 183**	**1 482 370**	**344 714 713**
Cost	4 307 700	1 700 946	328 387	13 876 324	98 407 045	18 035 835	6 964 535	8 078 896	6 040 492	36 250 015	388 800	237 717 183	2 315 076	434 411 234
Completed Assets	4 307 700	1 700 946	328 387	13 876 324	98 407 045	18 035 835	6 964 535	8 078 896	6 040 492	36 250 015	388 800		2 315 076	196 694 051
Under construction	-	-	-	-	-	-	-	-	-	-	-	237 717 183		237 717 183
Accumulated Depreciation	-	(1 660 986)	(328 169)	(2 280 995)	(39 143 049)	(10 517 263)	(2 553 975)	(5 917 395)	(2 391 809)	(23 914 526)	(155 648)		(832 706)	(89 696 521)



8. PROPERTY, PLANT AND EQUIPMENT (Continued)

	2018 R	2017 R
8.1 WORK IN PROGRESS		
Work in progress consists of the following asset classes		
Satellite Development	312 526 966	237 717 183

The satellite development programme commenced in 2015 with an expected completion date of August 2018, however the estimated completion date has been revised to December 2019. The revision on completion date is due to lack of funding for the Development Test Equipment and AIT Facilities upgrade and project stoppages due to insufficient funds to contract.

The project is funded by the Department of Science and Technology, through annual ring fenced transfers. This is 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 African. Development test equipment and the upgrade of assembly integration and test facilities needed an upgrade in order to perform quality tests on the instrument prior to its commissioning.

8.2 ASSETS GIVEN AS SECURITY

No assets were given as security.

8.3 INSURANCE PAY-OUTS RECEIVED

During the year a total amount of R 0.054 m (2017:R 0.594m) was received as insurance pay out for assets that were either damaged or stolen as follows: Plant Equipment R Nil (2017:R0.021m), Computer Equipment R0.068m (2017: R0.693) and Research Equipment R Nil (2017:R0.504m)

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

9. INTANGIBLE ASSETS

	2018 R	2017 R
At cost less accumulated amortisation and accumulated impairment losses	**16 095 034**	**20 099 532**

The entity does not have internally generated intangible assets

9.1 RECONCILIATION OF CARRYING VALUE OF INTANGIBLE ASSETS

31 March 2018

	Work in Progress	Intellectual Property	Computer Software	Total
Carrying value at 01 April 2017	**5 606 381**	**22 660**	**14 470 491**	**20 099 532**
Cost	5 606 381	2 822 660	36 740 425	45 169 466
Accumulated impairment	-	(1 440 000)	-	(1 440 000)
Accumulated amortisation	-	(1 360 000)	(22 269 934)	(23 629 934)
Acquisitions	**2 506 035**	**-**	**145 973**	**2 652 008**
Cost	2 506 035	-	145 973	2 652 008
Capitalised	-	-	-	-
Disposals	**-**	**-**	**-**	**-**
Cost of disposed asset	-	-	-	-
Accumulated amortisation of disposed asset	-	-	-	-
Amortisation				
Amortisation during the year	**-**	**-**	**(6 656 505)**	**(6 656 505)**
Carrying value at 31 March 2018	**8 112 416**	**22 660**	**7 959 959**	**16 095 034**
Cost	8 112 416	2 822 660	36 886 398	47 821 474
Accumulated impairment	-	(1 440 000)	-	(1 440 000)
Accumulated amortisation	-	(1 360 000)	(28 926 439)	(30 286 439)

9.2 RECONCILIATION OF CARRYING VALUE OF INTANGIBLE ASSETS

31 March 2017

	Work in Progress	Intellectual Property	Computer Software	Total
Carrying values at 01 April 2016	**-**	**262 660**	**21 452 766**	**21 715 426**
Cost	-	2 822 660	36 870 141	39 692 801
Accumulated impairment	-	(1 440 000)	-	(1 440 000)
Accumulated amortisation	-	(1 120 000)	(15 417 375)	(16 537 375)
Acquisitions	**5 606 381**	**-**	**14 959**	**5 621 340**
Cost	5 606 381	-	14 959	5 621 340
Capitalised	-	-		-
Disposals	**-**	**-**	**(5)**	**(5)**
Cost of disposed asset	-	-	(144 675)	(144 675)
Accumulated amortisation of disposed asset	-	-	144 670	144 670
Amortisation				
Amortisation during the year	**-**	**(240 000)**	**(6 997 229)**	**(7 237 229)**
Carrying values at 31 March 2017	**5 606 381**	**22 660**	**14 470 491**	**20 099 532**
Cost	5 606 381	2 822 660	36 740 425	45 169 466
Accumulated impairment	-	(1 440 000)	-	(1 440 000)
Accumulated amortisation	-	(1 360 000)	(22 269 934)	(23 629 934)

9.3 WORK IN PROGRESS - INTANGIBLE ASSETS

	2018 R	2017 R
Work in progress on intangible assets consists of the following asset classes:		
Computer Software - ERP system	**8 112 416**	**5 606 381**

SANSA is implementing a SAGE ERP system for its financial transactions. The implementation project commenced in August 2016. The project is currently near completion with parallel run and testing taking place. The final acceptance is envisaged for May 2018.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

10. TRADE AND OTHER PAYABLES FROM EXCHANGE TRANSACTIONS

	2018 R	2017 R
Trade creditors	1 632 380	752 384
Other creditors	731 307	267 247
Income received in advance[1]	7 002 191	7 324 495
Accrued expenses	5 013 098	5 747 132
Accrued leave[2]	7 036 776	5 928 786
Accrued Board Fees	34 620	210 339
Accrual for 13th cheque	658 293	619 751
Total Creditors	**22 108 665**	**20 850 135**

[1] Income received in advance consists of prepayments from customers of R7m (2017:R5m) and ISRSE conference registration fee R Nil (2017:R2.3m).

[2] Leave accrues to employees on an monthly basis, subject to certain conditions. The accrual is an estimate of the amount due at the reporting date. Employees may not accumulate more than 50 leave days at any given time and may not roll forward leave for a period of more than 6 months after year end.

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 the credit timeframe.

10.2 CLASSIFICATION OF FINANCIAL LIABILITIES

The Financial Liabilities of the entity is classified as follows:

Financial Liabilities	Classification	Carrying amount	
		2018 R	2017 R
Trade and other payables			
Trade creditors	At amortised cost	1 632 380	752 384
Other creditors	At amortised cost	731 307	267 247
Accrued expenses	At amortised cost	12 742 787	12 506 008
Long term liability			
Long term liability	At amortised cost	-	4 875 500

11. PROVISIONS

	2018 R	2017 R
Performance bonus provision	6 005 146	7 645 025
Total Provisions	**6 005 146**	**7 645 025**

The bonus provision represents the estimated liability in respect of performance bonuses payable to employees. Performance bonuses are not guaranteed and based on the assessed performance of the entity as well as employees.

Reconciliation of movement in provisions

Balance at beginning of year	7 645 025	6 961 610
Reversal of prior year (unutilised)/under estimated provision	(1 626 793)	(1 685 108)
Contributions to provision	6 005 146	7 645 025
Amount utilised during the year	(6 018 232)	(5 276 502)
Balance at end of year	**6 005 146**	**7 645 025**

12. COMMITTED CONDITIONAL GRANT LIABILITY

	2018 R	2017 R
Transfer payment from controlling entity	57 404 621	84 245 124
Transfer payment from other departments/entities	683 058	2 570 822
Total Committed conditional grant liability	**58 087 679**	**86 815 945**

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

Satellite development programme (Note 16.1.1)	4 027 386	48 869 897
Operation Phakisa - Earth observation data acquisition (Note 16.1.2)	26 592 000	4 548 000
Operation Phakisa - Ocean and coast information management system (Note 16.1.3)	-	22 044 000
Assembly, integration and test facilities upgrade (Note 16.1.4)	4 704 676	6 525 530
Earth Observation Data Center (Note 16.1.5)	20 980 000	-
Post graduate student bursary support programme (Note 16.2)	1 100 559	2 257 696
Research and human capital development grants (Note 16.3)	683 058	2 570 822
	58 087 679	**86 815 945**

Refer to Note 16.1; 16.2 and 16.3 for a full reconciliation of movement in ring fenced grants

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

13. LONGTERM LIABILITY

	2018 R	2017 R
Current portion of long-term liability	-	4 875 500
Non-current portion of long-term liability	-	-
Total Long-term liability	**-**	**4 875 500**

The Spot satellite telemetry terminal was acquired at a cost of EUR 4.2m (R30m) in 2013 payable in EUR 0.175m bi-annually over a five year period ending October 2017. There was no interest levied on this payment arrangement. The final instalment was paid in the current financial year.

14. OPERATING LEASE LIABILITY

	2018 R	2017 R
The following liabilities have been recognised in respect of non-cancellable operating leases:		
Balance at beginning of year	76 721	-
Operating lease liability during the period	(76 721)	76 721
Total Operating lease liability	**-**	**76 721**

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:		
Up to 1 year	**3 829 719**	**3 415 868**
Buildings	3 651 930	3 348 530
Office equipment	177 789	67 338
2 to 5 years	**4 477 452**	**-**
Buildings	3 944 085	-
Office equipment	533 367	-
Total Operating Lease Arrangements	**8 307 172**	**3 415 868**

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

No restrictions have been imposed on the entity in terms of the operating lease agreements.

15. ACCUMULATED SURPLUS

	2018 R	2017 R
Accumulated Surplus	484 442 643	407 303 944
Total Accumulated Surplus	**484 442 643**	**407 303 944**

The accumulated surplus represents the residual interest in the assets of the entity after deducting all its liabilities. This is mainly made up of the net book value of non-current assets of R447m (2017: R364m); current assets of R119.7m (2017:R172m) less current liabilities of R85.7m (2017:R129.5m). The cash portion of this balance is R97m (2017:R150.7m) to be utilised for payment of current liabilities of R85.7m (2017: R129.5m), with the remaining cash balance to cover commitments at year end.

16. TRANSFERS AND SUBSIDIES RECEIVED

	2018 R	2017 R
Operational grant	**131 226 000**	**124 977 000**
Parliamentary grant	131 226 000	124 977 000
Ring fenced grants	**87 725 382**	**102 255 738**
Conditions met - transferred to revenue (Note 16.1; 16.2 and 16.3)	87 725 382	102 255 738
Total Transfers and subsidies received	**218 951 382**	**227 232 738**

16.1 RECONCILIATION OF MOVEMENT IN RING FENCED GRANTS- SATELLITE PROGRAMME

Balance unspent at beginning of year (net of reallocation of funds)	81 987 427	81 363 924
Current year receipts	49 840 000	93 653 000
Reallocation of administration fee allocation from the CubeSat project	1 009 766	-
Conditions met - transferred to revenue	(76 533 131)	(93 029 497)
Management fee - transferred to revenue	-	(825 881)
Conditions still to be met - remain in liabilities	**56 304 062**	**81 161 546**

The satellite programme funding agreement includes five projects funded from the Economic competitiveness support package(ECSP) through the Department of Science and Technology (DST). 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:

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

16.1.1 SATELLITE DEVELOPMENT PROGRAMME - EO-SAT 1

	2018 R	2017 R
Balance unspent at beginning of year (net of reallocation of funds in 2017)	48 869 897	36 471 924
Current year receipts	28 860 000	93 653 000
Reallocation of administration fee allocation from the CubeSat project	1 009 766	-
Conditions met - transferred to revenue	(74 712 278)	(81 255 027)
Conditions still to be met - remain in liabilities	**4 027 386**	**48 869 897**

The satellite development project is a multi year project funded through a grant from DST. SANSA has a current contractual commitment with Denel Dynamics as the main contractor for the development of the satellite. The project is estimated to be completed in 2019/20 when additional funding to complete the project is secured.

16.1.2 OPERATION PHAKISA - OCEAN AND COAST SATELLITE DATA ACQUISITION

Balance unspent at beginning of year	4 548 000	4 548 000
Current year receipts	-	-
Reallocation from ocean and coast information management system	22 044 000	-
Conditions met - transferred to Revenue	-	-
Conditions still to be met - remain in liabilities	**26 592 000**	**4 548 000**

16.1.3 OPERATION PHAKISA - OCEAN AND COAST INFORMATION MANAGEMENT SYSTEM

Balance unspent at beginning of year	22 044 000	22 044 000
Current year receipts	-	-
Reallocation to Ocean and Coast satellite data acquisition	(22 044 000)	
Conditions met - transferred to revenue	-	-
Conditions still to be met - remain in liabilities	**-**	**22 044 000**

The funding contract conditions for the two Operation Phakisa projects were consolidated into the acquisition of Synthetic Apperture Radar (SAR) satellite data as the initial funds allocated were not sufficient to cover the licence fee to access a radar satellite for imagery to be ingested in the oceans and coast information management system. The tender process for the satellite service provider was concluded in April 2018.

16.1.4 ASSEMBLY, INTEGRATION AND TEST FACILITIES

Balance unspent at beginning of year	6 525 530	18 300 000
Current year receipts	-	-
Conditions met - transferred to Revenue	(1 820 854)	(11 774 470)
Conditions still to be met - remain in liabilities	**4 704 676**	**6 525 530**

16.1.5 EARTH OBSERVATION DATA INFRASTRUCTURE

Balance unspent at beginning of year	-	-
Current year receipts	20 980 000	-
Conditions met - transferred to revenue	-	-
Conditions still to be met - remain in liabilities	**20 980 000**	**-**

This grant is for the purpose of 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 to complement the EO-SAT-1 satellite development programme for the data infrastructure system.

16.2 POST GRADUATE STUDENT BURSARY SUPPORT PROGRAMME

	2018 R	2017 R
Balance unspent at beginning of year	2 257 696	2 463 799
Current year receipts	3 714 000	3 654 000
Conditions met - transferred to revenue	(4 871 137)	(3 860 103)
Conditions still to be met - remain in liabilities	**1 100 559**	**2 257 696**

16.3 RESEARCH AND HUMAN CAPITAL DEVELOPMENT GRANTS

Total

Balance unspent at beginning of year	2 570 822	2 238 438
Current year receipts	4 433 350	4 885 558
Current year refunds	-	(12 917)
Conditions met - transferred to revenue	(6 321 113)	(4 540 257)
Conditions still to be met - remain in liabilities	**683 058**	**2 570 822**

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) by particular researchers after successful application to a competitive programme. Some of the grants were purely mobility grants. All of the grants are multiple year awards and are on-going until the project is completed.

17. LIABILITY HELD ON BEHALF OF PRINCIPAL

Operation Phakisa - Cube satellite constellation initiative

Balance unspent at beginning of year (net of reallocation of funds in 2017)	9 268 569	18 353 253
Current year receipts	-	-
Reallocations to satellite programme (note 16.1.1)	(1 009 766)	-
Transferred to grant recipients	(8 258 803)	(8 258 803)
Management fee - transferred to revenue	-	(825 881)
Conditions still to be met - remain in liabilities	**-**	**9 268 569**

Funding was received from DST to fund in respect of Operation Phakisa - Cube Satellite Constellation Initiative. SANSA in compliance with its Grant Award Policy, went on an Ad-hoc Grant Call Advert to solicit proposals in respect of Operation Phakisa - Cube Satellite Constellation Initiative, which lead to the approval of the proposal from the Cape Peninsula University of Technology (CPUT). SANSA has entered into a contractual arrangement with CPUT in respect of the design, development, fabrication, qualification and delivery of the ZACube 2 Satellite Flight Model launch and operation. The funds were transferred to CPUT in full during the year. The ZACube 2 is now in preparation for launch in June 2018.

Financial risks associated with the relationship is in relation to cash flow where the principal obligations for the year might be above the current cash available, however the risk is minimised by the fact that cash allocation for SANSA's operational requirements and project requirements are all funded by the DST.

The non financial risk is that by using SANSA as an agent, for the above transaction DST is in fact giving SANSA the oversight role and thus SANSA will be held liable for delivery on the project.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

18. INTEREST INCOME

	2018 R	2017 R
Interest earned on bank accounts	8 310 533	9 578 633
	8 310 533	**9 578 633**

19. RENDERING OF SERVICES

Services to local public entities	21 582 437	21 438 027
Services to local private entities	4 148 748	797 973
Services to foreign clients	62 079 191	49 528 813
	87 810 375	**71 764 813**

20. OTHER INCOME

Sundry Income	178 729	541 183
Conference hosting fees	4 132 871	-
Project Revenue	6 770	294 773
Rent Received	315 020	311 064
Discount Received	1 257	845
Donation received	-	2 360
Expense Recovery	72 840	90 742
Insurance pay-out	68 525	594 492
Total Other Income	**4 776 010**	**1 835 459**

21. EMPLOYEE AND EMPLOYEE RELATED COSTS

	2018 R	2017 R
Employee related costs - salaries	102 480 125	95 709 273
Remote location allowance	3 071 615	3 177 341
Performance bonuses current year adjustment	4 923 071	5 808 886
Total Employee related costs	**110 474 811**	**104 695 500**
Remuneration of key management personnel of SANSA during the year:		
Remuneration of the Chief Executive Officer: Dr. V Munsami		
Annual Remuneration (Appointed January 2017)	2 167 171	479 421
Performance Bonus	-	-
Total	**2 167 171**	**479 421**
Remuneration of the Chief Executive Officer: Dr. S Malinga	-	
Annual Remuneration (Resigned August 2016)	-	867 961
Performance Bonus	-	-
Leave Pay Out	-	358 150
Total	**-**	**1 226 110**
Remuneration of the Interim Chief Executive Officer: Mr. P Maine		
Annual Remuneration[1] (August 2016 - January 2017)	-	917 283
Performance Bonus	-	-
Car and Travel Allowance	-	-
Leave Pay Out	-	78 680
Total	**-**	**995 963**

[1] Mr Maine did not receive Board remuneration during his appointment as the interim CEO from August 2016 to January 2017

Remuneration of the Chief Financial Officer: Ms. B Pono		
Annual Remuneration	1 672 730	1 558 813
Performance Bonus	96 847	90 511
Car and Travel Allowance	-	-
Total	**1 769 576**	**1 649 324**
Remuneration of the Executive Director Space Programme: Mr. A. Khatri		
Annual Remuneration	1 531 311	1 428 285
Performance Bonus	88 609	62 109
Car and Travel Allowance	-	-
Total	**1 619 920**	**1 490 395**
Remuneration of the Acting Executive Director Corporate Services: Dr. L McKinnell		
Acting Allowance	145 398	-
Total	**145 398**	

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

	2018 R	2017 R
Remuneration of the Acting Executive Director Corporate Services: Mr. I Tshweza		
Acting Allowance (October 2016 - March 2017)	-	82 226
Total	**-**	**82 226**
Remuneration of the Executive Director Corporate Services: Mr. Z Ndziba		
Annual Remuneration (Resigned September 2016)	-	726 696
Performance Bonus	-	-
Car and Travel Allowance	-	-
Leave Pay Out	-	198 186
Total	**-**	**924 882**
Remuneration of the Managing Director Space Operations: Mr. R Hodges		
Annual Remuneration	1 412 773	1 316 909
Performance Bonus	81 502	75 712
Car and Travel Allowance	60 000	60 000
Total	**1 554 276**	**1 452 620**
Remuneration of the Managing Director Earth Observation: Ms. A Mlisa		
Annual Remuneration (Appointed October 2017)	669 378	-
Performance Bonus	-	-
Leave Pay Out		-
Total	**669 378**	**-**
Remuneration of the Acting Managing Director Earth Observation: Dr. P Mangara		
Acting Allowance (February 2017 to September 2017)	63 826	30 022
Total	**63 826**	**30 022**
Remuneration of the Managing Director SANSA Earth Observation: Dr. J Olwoch		
Annual Remuneration (Resigned January 2017)	-	1 037 643
Performance Bonus	-	71 809
Leave Pay Out	-	36 050
Total	**-**	**1 145 502**
Remuneration of the Managing Director Space Science: Dr. L McKinnell		
Annual Remuneration	1 343 989	1 257 684
Performance Bonus	103 598	72 277
Total	**1 447 586**	**1 329 962**
Remuneration of the Acting Managing Director Space Science: Dr. G. Lamprecht		
Acting Allowance (April 2017 to March 2018)	74 003	-
Total	**74 003**	**-**

22. BOARD MEMBERS REMUNERATION

	2018		
	R	R	R
	Board Fees	Reimbursive Claims	Total
Non-executive Chairperson Ms J Lawrence	69 575	14 760	84 335
Other Board members	955 317	130 547	1 085 864
Total Board members Remuneration	**1 024 892**	**145 307**	**1 170 199**
Mr. V Gore	63 945	8 460	72 405
Mr. L S Hamilton	36 540	8 972	45 512
Mr. E Jansen	79 605	11 110	90 715
Ms. G Khambule	87 000	11 172	98 172
Mr. P Maine	84 298	13 014	97 312
Ms. M I Matooane	84 825	8 280	93 105
Ms. M Mfeka	70 035	8 839	78 874
Dr. N P Mjoli	71 775	9 677	81 452
Mr. J Prinsloo	90 869	14 278	105 147
Prof. R Bharuthram	52 418	9 162	61 580
Mr. M Rezelman	79 619	14 154	93 773
Mr. W J van Biljon	80 258	9 887	90 144
Mr M Riba [1]	-	-	-
Mr A Naidoo [2]	-	-	-
Ms. I M Pule	74 131	3 543	77 674

	2017		
	R	R	R
Non-executive Chairperson Ms J Lawrence	99 702	14 760	114 462
Other Board members	825 854	129 571	955 425
Total Board members Remuneration	**925 556**	**144 331**	**1 069 887**
Mr. V Gore	50 470	8 280	58 750
Mr. L S Hamilton	29 458	8 930	38 388
Mr. E Jansen	86 108	9 107	95 215
Ms. G Khambule	58 710	9 624	68 334
Mr. P Maine	53 560	5 796	59 356
Ms. M I Matooane	75 808	8 717	84 525
Ms. M Mfeka	98 880	10 102	108 982
Dr. N P Mjoli	54 769	9 213	64 009
Mr. J Prinsloo	79 310	25 407	104 717
Prof. R Bharuthram	49 234	8 280	57 514
Mr. M Rezelman	77 868	11 279	89 147
Mr. W J van Biljon	71 894	12 380	84 274
Mr M Riba [1]	-	-	-
Mr A Naidoo [2]	-	-	-
Ms. I M Pule (Appointed June 2016)	39 758	2 456	42 214

[1] Mr M Riba is a senior manager at the Department of Rural Development and Land Reform and appointed to the SANSA Board as a representative of DRDLR

[2] Mr A Naidoo is a senior manager at the Department of Environmental Affairs and is appointed to the SANSA Board as a representative of DEA

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

23. DEPRECIATION AND AMORTISATION

	2018 R	2017 R
Depreciation: Property, Plant and Equipment	18 743 020	16 641 101
Amortisation: Intangible Assets	6 656 506	7 237 229
Total Depreciation and Amortisation	**25 399 526**	**23 878 330**

24. REPAIRS AND MAINTENANCE

Plant & Machinery	4 160 979	1 382 973
General Repairs	2 885 149	2 862 410
Land & Buildings	1 698 835	1 800 243
Computer Equipment	786 813	667 325
Vehicles	458 470	90 343
Computer Software	341 977	395 870
Research Equipment	127 109	224 444
Laboratory Equipment	53 475	7 320
Furniture & Fittings	20 737	4 520
Total Repairs and Maintenance	**10 533 545**	**7 435 449**

25. FINANCE COSTS

Interest Paid	-	24 339
Total Interest Paid	**-**	**24 339**

26. DATA LICENCE FEES

Data licence fees	34 451 213	36 124 088
Total Data Licence Fees	**34 451 213**	**36 124 088**

Data licence fees consists mainly of SPOT satellite data access fees for downloading satellite imagery for earth observation application services.

27. STUDENT BURSARIES AND RESEARCH GRANTS PAID

Bursaries to students	5 326 392	5 158 393
Research and development	294 400	294 400
Total Grants and subsidies paid	**5 620 792**	**5 452 793**

28. ANTENNA INFRASTRUCTURE SERVICES

Antenna Infrastructure Services	3 270 496	203 266
Total Antenna Infrastructure Services	**3 270 496**	**203 266**

29. TRAINING EXPENSES

Staff Training	566 548	1 399 441
Staff Bursaries	659 826	320 582
Total Training Expenses	**1 226 374**	**1 720 023**

30. GENERAL EXPENSES

	2018 R	2017 R
Travel and accommodation	8 391 431	6 440 028
Electricity	7 561 078	7 229 075
Other General Expenses	5 479 559	6 096 045
Conferences and Seminars	830 204	1 003 739
Conference hosting fees	3 938 270	-
Data and internet services	4 035 359	3 249 289
Rent and lease charges	3 935 460	3 850 524
License fees	4 247 540	4 725 036
Audit Fees	2 255 004	1 922 055
Insurance	1 573 048	1 486 721
Security	1 192 132	1 130 511
Advertising & Marketing	1 096 419	1 458 394
Telephone Cost	942 988	1 092 485
Fuel and Oil	889 506	556 690
Printing and Stationery	666 924	901 864
Consulting fees	580 980	575 497
Entertainment	317 815	207 206
Transport Costs	306 017	199 415
Bank Charges	173 288	162 832
Legal Costs	125 063	-
Consumables	57 166	82 950
Discount Granted	1 327	-
	48 596 577	42 370 356

The amounts disclosed above for Other General Expenses are in respect of costs incurred in the general management of the entity and not directly attributable to a specific service or class of expense.

31. NET LOSSES ON FOREIGN EXCHANGE TRANSACTIONS

Gains in foreign exchange transactions	**(1 582 169)**	**(1 478 419)**
Gains in net Foreign Exchange - realised		(41 217)
Gains in net Foreign Exchange - unrealised	(1 582 169)	(1 437 202)
Losses in foreign exchange transactions	**3 443 213**	**2 830 436**
Losses in net Foreign Exchange - realised	3 426 690	2 774 775
Losses in net Foreign Exchange -unrealised	16 523	55 661
Net Losses on foreign exchange transactions	**1 861 044**	**1 352 017**

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

32. LOSS ON DISPOSAL OF PROPERTY, PLANT & EQUIPMENT

	2018 R	2017 R
Loss on Disposal of Property, Plant and Equipment	96 109	564 608
	96 109	**564 608**

33. NET CASH FLOWS FROM OPERATING ACTIVITIES

Surplus for the Year	**77 138 699**	**85 520 988**
Adjustment for:		
Depreciation and Amortisation	25 399 526	23 878 330
Loss on Disposal of Property, Plant and Equipment	96 109	564 608
Net Losses on foreign exchange transactions	1 861 044	1 352 017
Impairment of sundry debtors	8 916	-
Sundry income	(407 455)	(926 698)
Operating lease smoothing	-	76 721
Other non cash expenditure	-	39 736
Discount Received	(1 257)	(845)
Operating surplus before working capital changes	**104 095 583**	**110 504 856**
Increase in Inventory	(44 842)	(111 455)
Increase In Receivables from exchange transactions	(4 593 185)	(213 560)
Decrease in Trade and other payables	(38 454 905)	(20 848 192)
Cash flow from operating activities	**61 002 652**	**89 331 649**

34. BAD DEBTS

Bad debts	8 916	-
Bad Debts	**8 916**	**-**

35. FRUITLESS AND WASTEFUL EXPENDITURE

Fruitless and Wasteful Expenditure

Reconciliation of Fruitless Expenditure:		
Opening balance	-	-
Fruitless and Wasteful Expenditure incurred		10 032
Fruitless and Wasteful Expenditure Condoned	-	(10 032)
Fruitless and Wasteful Expenditure awaiting recovery or write off	**-**	**-**

Details of Fruitless and Wasteful Expenditure condoned

Nature of the expenditure	Condoned by Accounting Authority		
Fruitless expenditure incurred due to additional costs incurred for reworking of recognition award trophies as a result of an error on the message submitted for engraving.	The error was not intentional and administrative in nature. There is no employee liable in law.	-	10 032
		-	**10 032**

36. IRREGULAR EXPENDITURE

	2018 R	2017 R
Reconciliation of Irregular Expenditure:		
Opening balance	-	-
Irregular Expenditure incurred	-	37 553
Irregular Expenditure condoned	-	(37 553)
Irregular Expenditure awaiting condonation	**-**	**-**

Details of potential irregular expenditure awaiting investigation

Preferential procurement policy	Not yet investigated by the Accounting Authority		
A supplier with a higher scoring quotation/points was not selected to render services to SANSA. The reasons for selecting the supplier was not documented and investigated yet. However there was an evaluation report approved by the delegated official.	SANSA did not suffer any loss as rendered. The matter is a potential quote bidder was awarded instead still has to undergo internal investigation processes to confirm whether it is irregular and followed through with a recovery or a condonation by the delegated authority where appropriate.	-	-
Laundry services were paid using petty cash instead of being procured for via requests for quotations.	This still has to undergo internal investigation processes to confirm whether it is irregular and followed through with a recovery or a condonation by the delegated authority where appropriate.		

Details of irregular expenditure condoned.

Contract management	Condoned by Accounting Authority		
No proper approval of the extension of the copier machine contract through a variation order. Subsequent approval obtained, but due to payments made, these became a non-compliance with supply chain management regulations in particular to the management of variation of contracts.	SANSA did not suffer any loss, as the copier machines were used in the course of business. There is therefore no person liable in law.	-	37 553
		-	**37 553**

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

37. COMMITMENTS FOR EXPENDITURE

Capital and Expenditure Commitments	2018	2017
- Approved and Contracted for:-	**144 085 771**	**78 423 380**
Property, Plant and Equipment	100 879 699	55 971 464
Intangible assets	185 592	3 828 211
Principal agent	-	8 258 803
Expenditure	43 020 480	10 364 902
Total Capital and Expenditure Commitments	**144 085 771**	**78 423 380**
This expenditure will be financed from:		
Transfers and subsidies	144 085 771	78 423 380
	144 085 771	**78 423 380**

38. EMPLOYER RETIREMENT BENEFIT INFORMATION

The only obligation of the entity with respect to the retirement benefit plans is to make the specified contributions.

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. Refer to Note 21.

39 . RELATED PARTY TRANSACTIONS

39.1 RELATED PARTY RELATIONSHIPS: REVENUE AND RECEIVABLES

South African National Space Agency (SANSA) is a Public Entity under the control of the Department of Science and Technology South Africa. The Agency is a schedule 3A Public entity in terms of the Public Finance Management Act, Act 1 of 1999 as amended by Act 29 of 1999, and therefore falls within the national sphere of government. SANSA has a significant number of related parties, being those that fall within the national sphere of government. Amounts due from / (to) these entities are subject to the same terms and conditions as normal trade receivables and trade payables and transactions with these entities are concluded at arm's length.

A detailed list of transactions with related parties and amounts due to / from related parties are as follows:

	2018		2017	
	R		R	
Entity Name	**Revenue**	**Receivables**	**Revenue**	**Receivables**
Department of Science and Technology	218 951 382	-	227 232 738	-
Air Traffic Navigation Services SOC Limited (ATNS)	-	16 000	-	-
Armaments Corporation of South Africa Limited (ARSMCOR)	4 208 838	224 865	2 745 022	238 660
Council for Scientific and Industrial Research (CSIR)	-	31 863	32 330	-
Denel Aviation	2 500	-	5 000	2 500
Denel Soc Ltd t/a Denel Dynamics	-	19 021	85 498	58 895
Eskom	558 513	46 744	446 468	46 399
Institute for Maritime Technology	1 068 639	788 470	719 311	310 575
National Research Foundation (NRF)	4 433 350	-	4 855 558	-
National Research Foundation (NRF - HartRAO)	3 767 680	-	3 762 077	-
South African Agency for Science and Technology Advancement (SAASTA)	-	-	125 612	-
	232 990 901	**1 126 963**	**240 009 614**	**657 029**

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

39.2 RELATED PARTY RELATIONSHIPS: PURCHASES AND PAYABLES

	2018		2017	
	R		R	
Entity Name	**Purchases**	**Payables**	**Purchases**	**Payables**
Council for Scientific and Industrial Research (CSIR)	-	-	93 365	-
Armaments Corporation of South Africa Limited (ARSMCOR)	9 741	1 080	817	-
Denel Soc Ltd t/a Denel Dynamics	63 141 087	-	77 248 813	
Denel Overberg Test Range	-	-	1 452	-
Engineering Council of South Africa (ECSA)	-	-	9 166	-
Eskom	6 366 515	9 204	4 381 347	
Government Printing Works	5 250	-	19 657	
Independent Communications Authority of South Africa (ICASA	886 870	-	1 669 077	
SA Post Office (SAPO)	-	-	795	-
Sentech	18 301	-	17 200	
South African Astronomical Observatory (SAAO)	137 850	-	259 559	
South African Broadcasting Corporation Limited	5 672	-	5 458	-
South African Bureau of Standards (SABS)	94 327	-	131 936	
South African Civil Aviation Authority (SACAA)	4 665	-	3 380	-
South African Agency for Science & Technology Advancement (SAASTA)	-	-	185 974	9 058
Telkom SA Limited	696 669	-	69 696	-
	71 366 947	**10 285**	**84 097 693**	**9 058**

With the exception of transactions disclosed below, all other transactions with related parties were 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.

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 16.3

SANSA has a current contractual commitment with Denel for the development of the satellite. This is a multi year project funded through a grant from DST. Refer to Note 16.1.1 for detailed disclosure of revenues and liabilities relating to this project.

During the 2017 financial year under review mosaic images were provided at no arms length to the following related party as no fee was charged for the services rendered:

2018	2017
1. Council for Scientific and Industrial Research	1. Council for Scientific and Industrial Research
2. Department of Water and Sanitations	2. Department of Water and Sanitations
3. Eskom	3. Eskom
4. Department of Agriculture, Forestry and Fisheries	4. Department of Agriculture, Forestry and Fisheries
5. Department of Environmental Affairs	5. Department of Environmental Affairs
6. Statistics South Africa	6. Statistics South Africa
7. Department of Defence -National Geo-spatial Information	
8. South African Police Service	

39.3 RELATED PARTY RELATIONSHIPS: 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)

Chief Financial Officer - Ms. B Pono

Executive Director Space Programme - Mr. A Khatri

Acting Executive Director Corporate Services - Dr. L. McKinnell (Acting April 2017- March 2018)

Managing Director Space Science - Dr. L McKinnell

Managing Director Space Operations - Mr. R Hodges

Managing Director Earth Observations - A. Mlisa (Appointed: 1 October 2017)

Acting Managing Director Earth Observations - Dr. P Mangara (Acting April 2017-October 2017)

Acting Managing Director Space Science - Dr. G. Lamprecht (Acting April 2017- December 2017)

For key management emoluments, refer to note 21 and note 22.

40 . 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 Technology 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 is also being finalised and will be 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.

41. IN-KIND DONATIONS AND ASSISTANCE

No donations in-kind and assistance were received at 31 March 2018

42. EVENTS AFTER THE REPORTING DATE

No events having financial implications requiring disclosure occurred subsequent to 31 March 2018.

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

43. 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.

44. 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 reviewed by internal and external auditors on a continuous basis.

The carrying amounts of financial liabilities at reporting date was:	**2018** **R**	**2017** **R**
Trade and other payables	15 106 475	13 525 640
Current Portion -Long Term Liability	-	4 875 500
Operating Lease Liability	-	76 721
	15 106 475	**18 477 861**

44.1 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 2018	**Floating Interest Rate** **R**	**Non-interest Bearing** **R**	**Total** **R**
Assets			
Receivables from Exchange Transactions	-	25 393 824	**25 393 824**
Cash and cash equivalents	97 219 185	4 299	**97 223 484**
Liabilities			
Trade and other payables	-	(22 108 665)	**(22 108 665)**
Operating lease			**-**
Net Financial assets/(Liabilities)	**97 219 185**	**3 289 457**	**100 508 641**

31 March 2017	**Floating Interest Rate** **R**	**Non-interest Bearing** **R**	**Total** **R**
Assets			
Receivables from Exchange Transactions	-	20 800 639	**20 800 639**
Cash and cash equivalents	150 753 545	4 135	**150 757 680**
Liabilities			
Trade and other payables	-	(20 850 135)	**(20 850 135)**
Long Term Liability	76 722	(4 875 500)	**(4 798 778)**
Net Financial assets/(Liabilities)	**150 830 267**	**(4 920 861)**	**145 909 406**

Interest Rate Sensitivity Analysis

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

		2018	2017
Financial Assets	**Classification**	**R**	**R**
External investments:			
		-	-
Bank balances	Financial assets at amortised cost	97 219 185	150 753 545
Cash Floats	Financial assets at amortised cost	4 299	4 135
		97 223 484	**150 757 680**
Interest received		**8 310 533**	**9 578 633**
Interest rate		**8.5%**	**6.4%**
Effect of a change in interest rate on interest earned from external investments:			
Effect of change in interest rate	%	**1%**	**1%**
Effect of change in interest rate	Rand value	**972 235**	**1 507 577**
Effect of change in interest rate	%	**-1%**	**-1%**
Effect of change in interest rate	Rand value	**(972 235)**	**(1 507 577)**

NOTES TO THE FINANCIAL STATEMENTS

For the year ended 31 March 2018

44.2 LIQUIDITY RISK

The entity prevents liquidity risk by maintaining adequate banking facilities and by receiving contributions annually in the form of Grants.

The following are the contractual maturities of financial liabilities, including interest payments and excluding the impact of netting agreements for the entity:

	2018				
	Carrying amount	Contractual cash flows: 1 month or less	Contractual cash flows: 1 -3 months	Contractual cash flows: 3 - 12 months	Contractual cash flows: 12 - 60 months
	R'000	R'000	R'000	R'000	R'000
Non-derivative financial liabilities					
Trade and other payables	15 106 475	15 106 475	-	-	-
	15 106 475	**15 106 475**	**-**	**-**	**-**

	2017				
	Carrying amount	Contractual cash flows: 1 month or less	Contractual cash flows: 1 -3 months	Contractual cash flows: 3 - 12 months	Contractual cash flows: 12 - 60 months
	R'000	R'000	R'000	R'000	R'000
Non-derivative financial liabilities					
Trade and other payables	13 525 640	13 525 640	-	-	-
Long term Liability	4 875 500		1 929 585	2 945 915	-
	18 401 140	**13 525 640**	**1 929 585**	**2 945 915**	**-**

44.3 MARKET AND CREDIT RISK

Financial assets which potentially subject the entity to the risk of non-performance by counter parties consist of Receivables from exchange and non-exchange.

An allowance for impairment is established based on management's estimate of any identified potential losses in respect of Receivables from exchange and non-exchange. Bad debts identified are written off as they occur. The entity does not have any significant credit risk exposure to any single counterparty. 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 2018			
	ZAR	**EURO**	**USD**	**GBP**
Receivables from Exchange Transactions	8 348 672	190 121	1 192 345	13 740
Trade payables	(14 970 334)	-	(11 547)	-
Gross exposure	**(6 621 662)**	**190 121**	**1 180 798**	**13 740**

	31 March 2017			
	ZAR	**EURO**	**USD**	**GBP**
Receivables from Exchange Transactions	12 639 583	9 741	616 979	1 250
Trade payables	(16 774 285)		(131 299)	
Gross exposure	**(4 134 702)**	**9 741**	**485 680**	**1 250**

The following significant exchange rates applied during the year:

	2018	**2017**
Year-end spot rate		
Euro	14.52	13.93
GBP	16.51	16.16
USD	11.79	12.97

Sensitivity analysis

A 10% weakening of the rand against the above currencies at 31 March would have had the equal but opposite effect on the above currencies to the amounts shown above, on the basis that all other variables remain constant.

Euro	276 056	135 770
GBP	22 685	2 020
USD	1 392 161	630 160
Total	**1 690 901**	**767 950**

A 10% strengthening of the rand against the following currencies at 31 March 2018 would have decreased profit or loss by the amounts shown below. This analysis assumes that all other variables remain constant. The analysis is performed on the same basis as was performed at 31 March 2018.

SOUTH AFRICAN NATIONAL SPACE AGENCY

Tel: 012 844 0500

Fax: 012 844 0396

Email: information@sansa.org.za

Physical address

South African National Space Agency (SANSA)

Enterprise Building

Mark Shuttleworth Street • Innovation Hub

Pretoria • 0087

Gauteng • South Africa

RP364/2018

ISBN: 978-0-621-46748-2