nmisa
National Metrology Institute of South Africa

nmisa

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celebration

ANNUAL REPORT 2016/17

PART A GENERAL INFORMATION 2

1.1 NMISA's General Information 3
1.2 List of Acronyms 4
1.3 Foreword by the Minister 6
1.4 Foreword by the Chairperson 7
1.5 The CEO's Overview 8
1.6 Statement of Responsibility and Accuracy 10
1.7 Submission to the Executive Authority 11
1.8 NMISA Board Members and Executive 12
1.8.1 Board of Directors 12
1.8.2 Executive Management 16
1.9 Strategic Overview 17
1.9.1 Vision, Mission and Values 17
1.10 Legislative and Other Mandates 18
1.11 Organisational Structure 19

PART B PERFORMANCE INFORMATION 20

2.1 Situational Analysis 21
2.1.1 Service Delivery Environment 21
2.1.2 Organisational Environment 21
2.1.3 Strategic Outcome Oriented Goals and Objectives 21
2.2 Programme Information 22
2.2.1 Integrated Value Chain 22
2.2.2 Energy Efficiency 23
2.2.3 Advanced Measurement Solutions 23
2.2.4 Reference Materials 23
2.2.5 Green Economies 25
2.2.6 Redefinition of the SI 25
2.2.7 Manufacturing Competitiveness 26
2.2.8 Quality of Life 26
2.2.9 Commercialisation 27
2.2.10 Regional Integration 27
2.3 Performance Information 29

PART C GOVERNANCE 33

3.1 Introduction 34
3.2 Executive Authority 34
3.3 The Accounting Authority/Board Charter 34
3.3.1 The Board 34
3.3.2 Sub-Committees of the Board 34
3.3.3 Risk Management and Internal Control 35
3.3.4 Internal Audit and Audit Committees 35
3.3.5 Compliance with Laws and Regulations 36
3.3.6 Fraud and Corruption 37
3.3.7 Minimising Conflict of Interest 37
3.3.8 Code of Conduct 37
3.3.9 Health, Safety and Environmental Issues 37
3.3.10 Company Secretary 38
3.3.11 Social Responsibility 38
3.3.12 Audit Committee Report 39

PART D HUMAN RESOURCE MANAGEMENT 40

4.1 Introduction 41
4.2 Investing in NMISA's People 41

PART E AUDITED FINANCIAL INFORMATION 46

5.1 CFO's Report 47
5.1.1 Overview 47
5.1.2 Revenue 47
5.1.3 Revenue from Services Rendered 47
5.1.4 Spending Trends 48
5.1.5 Commitments 48
5.1.6 Surplus 49
5.1.7 Working Capital 49
5.1.8 Capital Investments 49
5.1.9 Financial Outlook 49
5.2 Independent Auditor's Report 50
5.3 Statement of Financial Position as at 31 March 2017 54
5.4 Statement of Financial Performance for the Year ended 31 March 2017 ... 55
5.5 Statement of Changes in Net Assets for the Year ended 31 March 2017 ... 56
5.6 Cash Flow Statement for the Year ended 31 March 2017 57
5.7 Statement of Comparison of Budget and Actual Amounts for the Year ended 31 March 2017 58
5.8 Accounting Policies 59
5.9 Notes to the Annual Financial Statements 70

PART A
GENERAL INFORMATION

1.1 NMISA'S GENERAL INFORMATION

NAME	National Metrology Institute of South Africa (NMISA)
PHYSICAL ADDRESS	Meiring Naude Road Brummeria Pretoria
POSTAL ADDRESS	Private Bag X34 Lynnwood Ridge 0040 South Africa
TELEPHONE NUMBER	027 (12) 841 4152
FAX NUMBER	027 (12) 841 2131
EMAIL ADDRESS	info@nmisa.org
WEBSITE ADDRESS	www.nmisa.org
EXTERNAL AUDITORS	NEXIA SAB&T Pretoria
BANKERS	Standard Bank Lynnwoord Ridge Pretoria
COMPANY/ BOARD SECRETARY	Mr Charles Kgoale

1.2 LIST OF ACRONYMS

ACDC	Alternating Current Direct Current
AFRIMETS	Intra-Africa Metrology System
AFRA	African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology
AFRAC	African Accreditation Cooperation
AFSEC	African Electro-Technical Standardisation Commission
AG	Auditor-General
AMI	Advanced Metals Initiative
ARSO	African Organisation for Standardisation
APMP	Asian Pacific Metrology Programme
AWS	Automated Weighing System
BD	Business Development
BIPM	International Bureau of Weights and Measures
BRIC	Brazil, Russia, India and China
BTEX	Benzene, Toluene, Ethyl Benzene and Xylenes
CC	Consultative Committee
CCRI	Consultative Committee for Ionising Radiation
CCQM	Consultative Committee Amount of Substance
CCU	Consultative Committee for Units
CD	Chromatic Dispersion
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CFTA	Continental Free-Trade Area
CGPM	General Conference on Weights and Measures
CIE	International Commission on Illumination
CIPM	International Committee for Weights and Measures
CMC	Calibration and Measurement Capabilities
CMM	Coordinate Measuring Machine
Co-60	Cobalt 60 source
COTII	Committee of Trade and Industry Institutions
CRM	Certified Reference Material
CSIR	Council for Scientific and Industrial Research
DDT	Dichlorodiphenyltrichloroethane
EAC	East African Community
EAMET	East African Community Sub-committee on Metrology
EDS	Energy Dispersive Detector
EE	Employment Equity
EGM	Expert Group Meeting
EHS	Environment, Health and Safety
EMS	Environmental Management Sysytem
EY	EY (external audit firm)
EXCO	Executive Committee
GAW	Global Atmospheric Watch
GDP	Gross Domestic Product
GHG	Green House Gasses
HCD	Human Capital Development
HEI	Higher Education Institutions
HVAC	Heating, Ventilation and Air conditioning
IAEA	International Atomic Energy Agency
ICT	Information and Communication Technology
IEC	International Electro-technical Committee
IPAP	Industrial Policy Action Plan
IPK	International Prototype of the Kilogram
IPSAS	International Public Sector Accounting Standards
IR	Ionising Radiation
ISO	International Standards Organisation
JCRB	Joint Committee of Regional Metrology Organisations and the BIPM
KCDB	Key Comparison Database
KPI	Key Performance Indicator
KRISS	Korean Research Institute of Standards and Science
KZN	KwaZulu-Natal
LED	Light-emitting Diode
MoU	Memorandum of Understanding
MRA	Mutual Recognition Arrangement
MSc	Master's degree in Science
MTEF	Medium-term Expenditure Framework
NDoH	National Department of Health
NDP	National Development Plan
NEDLAC	National Economic Development and Labour Council
NIM	National Metrology Institute of China
NMI	National Metrology Institute
NMISA	National Metrology Institute of South Africa
NMS	National Measurement Standard
NNR	National Nuclear Regulator
NPA	National Prosecuting Authority
NPL	National Physics Laborotary of the United Kingdom
NRCS	National Regulator for Compulsory Specifications
NRL	National Reference Laboratory
NRF	National Research Foundation

NSI	National System of Innovation
NSBC	National Small Business Chamber
OEM	Original Equipment Manufacturer
OH&S	Occupational Health & Safety
OIML	International Organisation of Legal Metrology
PAQI	Pan-African Quality Infrastructure
PFMA	Public Finance Management Act
PhD	Doctor of Philosophy
PMD	Polarisation Mode Distersion
POPs	Persistent Organic Pollutants
PPP	Purchasing Power Parity
PPP	Private Public Partnership
PRGMs	Primary Reference Gas Mixtures
PTB	National Metrology Institute of Germany
Pt-Ir	Platinum-Iridium
PTS	Proficiency Testing Schemes
QS	Quality System
REC	Regional Economic Communities
RISDP	Regional Indicative Strategic Development Plan
RMO	Regional Metrology Organisation
SA	South Africa
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SADCMET	SADC Cooperation in Measurement Traceability
SANAS	South African National Accreditation System
SANS	South African National Standards
SCM	Supply Chain Management
SCOPA	Standing Committee on Public Accounts
SEDA	National Small Business Chamber
SEM	Scanning Electron Microscope
SI	International System of Units
Si	Silicon
SMME	Small, Medium and Micro Enterprise
SME	Small and Medium Enterprise
SQAM	Standards, Quality Assurance, Accreditation and Metrology
TAF	Technical Advisory Forum
TBT	Technical Barrier to Trade
TC	Technical Committee
TCDR	Triple-to-Double Coincidence Ratio
TEI	Tertiary Education Institute
The Act	Measurement Units and Measurement Standards Act, No. 18 of 2006
the dti	Department of Trade and Industry
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environmental Programme
UNIDO	United Nations Development Organisation
UTC	Coordinated Universal Time
VOC	Volatile Organic Compound
WG	Working Group
WMO	World Meteorological Organisation
XPS	X-ray Photoelectron Spectroscope

1.3 FOREWORD BY THE

MINISTER

Dr Rob Davies, MP
Minister of Trade and Industry

The end of the year marked the beginning of the 10th year in existence of the National Metrology Institute of South Africa (NMISA). With such a significant milestone upon us, it gives me great pleasure in announcing that NMISA achieved 100% performance and yet another consecutive unqualified audit opinion in the 2016/17 financial year. This consistent, high level of performance provides confidence in knowing the mandate established under the Measurement Units and Measurement Standards Act, No 18 of 2006 is being carried out efficiently.

NMISA is mandated in ensuring measurement equivalence with the global International System of measurements, the SI. Metrology plays a fundamental role in numerous aspects of everyday life and NMISA contributes specifically in metals fabrication, automotive and components, plastics, pharmaceuticals and chemicals, bio-fuels, green economies, agro-processing and business sectors to mention but a few. Considering the slow growth outlook in the current economic climate, it is significant for all locally produced goods to compete in world markets and NMISA's collaborative efforts with **the dti** and other government departments to improve competitiveness in South African industries is notable.

NMISA underpins all accurate measurements for the country and the region and provides for international acceptance of local measurements. This is important since the world economy is now moving into what has been defined as the fourth industrial revolution, Industry 4.0, characterised by highly flexible industrial production with strong customisation of products. The design principles of industry 4.0, such as the ability to collect and analyse data and provide Real Time capability, will be highly dependent on accurate measurements and measurement solutions.

NMISA strives to be at the forefront of traceability and research is critical for further development and improvement of the current national measurement standards. In support of the regional integration mandate of **the dti**, NMISA continually focusses on efforts to shorten the traceability chain for South Africa and the continent in the context of the continental free trade area negotiations currently underway. NMISA therefore continued in the implementation of the recapitalisation project to deal with the aging infrastructure challenge. Approximately R169 million was invested in the procurement of capital equipment to keep abreast with technological advances across several disciplines. I am confident that NMISA will continue addressing challenges ahead with commitment, dedication, integrity and service excellence that has been characteristic of the organisation in the past.

I would like to thank each of the NMISA Board members for being extraordinarily generous with their time and wisdom in ensuring that NMISA remains committed to its mission and guiding principles. Their hard work and commitment towards building a strong and effective organisation is admirable.

I look forward to NMISA's contribution to the National Development Plan (NDP), nine-point plan and ensuring that they live the vision of being a measurement centre of excellence inspired to consistently deliver outstanding, innovative and internationally comparable measurement solutions that support our country's trade, people's quality of life and enables the protection of the environment.

Dr R Davies
Minister
the dti
31 July 2017

1.4 FOREWORD BY THE

CHAIRPERSON

Dr P Nevhutalu
NMISA Chairperson

Metrology impacts every sphere of society and most importantly, measurement assists with the improvement of the competitiveness of the South African industry in support of the national strategic initiatives. Important decisions (economic, social and medical) are based on results of measurements. Measurements are part of our daily lives and wrong or inaccurate measurement can result in losses, disagreement between trading partners and it can also cause harm to people and the environment; our very survival depends on the ability to measure accurately.

NMISA's programmes are structured in support of the nine-point plan and the implementation of the Industrial Policy Action Plan (IPAP) and the delivery and service environment for NMISA has now been tailored to report against the matrix structure in the form of programmes underpinned by regional integration and maintenance of the national measurement standards.

I am pleased to present the NMISA 2016/17 Annual Report highlighting continued establishment and maintenance of the primary standards to realise the International System of Units (SI). Maintainance of secondary standards to transfer the traceability to the primary standards continues. The dissemination from the secondary or transfer standard to industry happens though calibration, training, technical support, as well as development and research projects that contribute towards clear deliverables against strategic objectives, publications and human capital development.

The organisation achieved its targets for the year. I am especially pleased that the organisation has once again managed to maintain an unqualified audit opinion. The continued commitment by the Board of Directors in providing guidance and direction complimented by the consistent hard work of all the staff under the leadership of the CEO is bearing fruit. The organisation continued maintaining the total quality management system and accreditation to ISO 17025 for the laboratories, ISO guide 34 for reference material production laboratories as well as maintenance of certification to ISO 14001 and OHSAS 18001 for environmental, health and safety.

The feasibility study for recapitalisation of NMISA laboratory infrastructure was concluded during the year and submitted to National Treasury for approval to proceed with the next step of the project in line with Private-Public Partnership (PPP) manual. We are anticipating feedback from National Treasury in the 2017/18 financial year.

I would like to end by thanking all the stakeholders and **the dti** in particular for their confidence in NMISA and continued financial support. I would also like to thank all our partners and collaborators both locally and internationally.

Dr P Nevhutalu
Chairperson
NMISA

31 July 2017

1.5 OVERVIEW BY THE

CHIEF EXECUTIVE OFFICER

Mr Ndwakhulu Mukhufhi
Chief Executive Officer

NMISA was established under the Measurement Units and Measurement Standards Act, No. 18 of 2006 (The Measurement Act) as the custodian of the national measurement units and national measurement standards (NMS). In this role, as part of the South African Technical (Quality) Infrastructure, NMISA maintains and ensures the appropriate application of the International System of Units (SI) and other measurement units as defined by NMISA in consultation with the measurement community, for the country.

NMISA also keeps, maintains and disseminates the gazetted NMS. This role is performed through various products and services and is influenced by the external environment.

The trade of goods and services around the world is the lifeblood of the global economy, and is increasingly important to domestic economic growth, productivity and investment opportunities. For customers to consider trade to be fair and benefit from it, measurements taken in different parts of the world need to be equivalent to each other, and accepted by each other. Important decisions (economic, social and medical-) are based on measurement results. NMISA contributes to all government key priorities as encapsulated in the National Development Plan and operationalised through the Industrial Policy Action Plan (IPAP).

During the year under review NMISA continued delivering on its mandate with a special focus of reorganising our programmes for increased provision of relevant fit for purpose measurement solutions to the South African Economy. To achieve this and acknowledging the increasing demand for measurement capability, NMISA dedicated the 2016/17 financial year to a consolidation of its research and overall activities under the overall theme of shortening the traceability chain for South Africa and the African continent. Eight thematic thrusts were developed and implemented in alignment to IPAP and other national priorities. The eight strategic thrusts are:

i. Reference Materials;
ii. Manufacturing Competitiveness;
iii. Quality of Life;
iv. Energy Efficiency;
v. Green Economy Measurement Tools;
vi. Redefinition of the SI (shortening the traceability chain for Africa);
vii. Advanced measurement solutions; and
viii. Commercialisation.

These thematic thrusts are underpinned by Regional and International integration which is one of **the dti**'s strategic focus areas. The Research that underpins the national measurement standards involves collaborative associations and projects with Government, Science Institutes and Academia. NMISA continued to maintain the strategic partnership with these entities both nationally and internationally.

The organisation continued with the recapitalisation project started in the 2013/14 financial year to deal with the challenge of aging infrastructure and equipment. Expenditure on capital equipment for the year was R169 million. The efficiency of the Supply Chain Management (SCM) process was improved during the year resulting in the conclusion of all tenders on the procurement plan during the second quarter of the financial year. This efficiency combined with a favourable Rand-Dollar exchange rate experienced in the year resulted in savings. The board then approved the procurement

"During the year under review NMISA continued delivering on its mandate with a special focus of reorganising our programmes for increased provision of relevant fit for purpose measurement solutions to the South African Economy"

of equipment on the next priority list on the equipment recapitalisation project during the second and third quarters of the year. The upgraded equipment is already contributing to improved measurement capability and the ability of the organisation to earn external revenue to enhance long term sustainability. The feasibility study for the development of new and modern laboratories was concluded during the year and submitted to National Treasury for TA1 approval in line with the PPP manual. Treasury approval for continuation with the next phase of the project is anticipated early in the 2017/18 financial year.

During the year, NMISA continued its high-performance standard realised in recent years. The organisation met and/or exceeded its set targets. The organisation once more received an unqualified audit opinion from Nexia SAB&T our external auditors.

NMISA adheres to a total quality management system and has identified the regulatory requirements applicable to its services, operations and products in order to ensure compliance. NMISA received certification of its OH&S and EMS management system to ISO14001 and OHSAS 18001. Almost all the technical laboratories are accredited to ISO/IEC 17025, whilst two of the chemistry laboratories are also accredited to ISO Guide 34 (production of reference materials).

I would like to thank the NMISians for their contribution to the good results realised in the year as we continue to deliver on our mandate. In the implementation of the Matrix approach, it is important to fly with our strengths while allowing others to compliment us on our weaknesses. On behalf of the NMISA Executive Management and staff, I would like to thank the NMISA board for their continued guidance and support. In conclusion, I would like to express special appreciation for support from **the dti** and all our stakeholders and partners locally and internationally. Our success truly depends on your continued support.

2017 marks 70 years of metrology in South Africa and 10 years since the establishment of NMISA. I am looking forward to yet another successful year of measurement excellence.

Mr Ndwakhulu Mukhufhi
Chief Executive Officer
NMISA

31 July 2017

1.6 STATEMENT OF RESPONSIBILITY AND ACCURACY

SUBMISSION OF THE ANNUAL REPORT BY THE CHAIRPERSON OF THE BOARD

It is with great pleasure that I, as the Chairperson of the Board of NMISA, submit the performance and progress of the entity for the financial year 2016/17 in terms of the Public Finance Management Act No. 1 of 1999.

Dr Prinsloo Nevhutalu

31 July 2017

1.7 SUBMISSION TO THE EXECUTIVE AUTHORITY

It is hereby certified that this Annual Report:

- Was prepared by the management of NMISA under the guidance of the Board and the Board Chair, Dr Prins Nevhutalu;
- Accurately reflects the performance outputs that NMISA has achieved, given the resources made available in the budget for 2016/17.

Mr Ziyaad Adam
Interim Chief Financial Officer

Mr Ndwakhulu Mukhufhi
Chief Executive Officer

Dr Prinsloo Nevhutalu
Accounting Authority

Dr Rob Davies
Executive Authority

1.8 NMISA BOARD MEMBERS AND EXECUTIVE

1.8.1 BOARD OF DIRECTORS

DR PRINSLOO NEVHUTALU

Appointed 2013

Non-Executive Director

MSc – University of the North
PhD – Northern Illinois

Dr Nevhutalu is the current Vice-Chancellor of the Cape Peninsula University of Technology. Previously worked as the Executive Director at the NRF, Deputy Vice-Chancellor at TUT, Deputy Vice-Chancellor at University of Zululand. He is the current deputy Chair of Universities South Africa (USAf) and serves as the member of the Government Human Development committee.

MR NDWAKHULU MUKHUFHI

Appointed 2013

Executive Director

NMISA CEO

BSc – Honors - Biochemistry University of Limpopo
MSc – Biochemistry and Molecular Biology - University of Limpopo
Post Graduate Diploma – Project Management Cranefield College

Mr Mukhufhi has experience in the scientific domain and technology industries. He was a General Manager: Incubation and Skills Development of the Innovation Hub, CEO of the South African Essential Oils Business Incubator (SEOBI) and a founding CEO of the Biodiesel Production Business Incubator called BBI. Mr Mukhufhi started his career in a quality managed environment as a Molecular diagnostics Project Leader at the Agricultural Research Council (ARC) Bacteriology department.

MR THEMBANI BUKULA

Appointed - 2013

Non-Executive Director

Chairperson: Finance Committee

MSc – Mathematics, Science & Technology Education - University of South Africa
Post graduate diploma in Engineering Business Management - Warwick University
BSc – Engineering - University of Natal

Mr Bukula has been the Regulator Member primarily responsible for electricity regulation at the National Energy Regulator of South Africa (NERSA) since 2005. He has held company directorship positions in various companies including National Electrical Test Facility (NETFA), the South African Bureau of Standards (SABS) – Testing and Conformity Services, National Data Systems and Bytes Managed Services. He has vast experience in the engineering field. Thembani chairs the Finance committee and serves as a member of the HR committee.

Appointed 2013

Non-Executive Director

Chairperson: Technical Committee

PhD – Semiconductor Physics from the University of Cambridge Cavendish Laboratory in the UK

Dr Nemutudi is the Deputy Director of iThemba LABS (Laboratory for Accelerator Based Sciences); a National Research Facility administered by the National Research Foundation (NRF). He is currently the Associate Secretary General of the International Union of Pure and Applied Physics (IUPAP), and serves as a national board member of the International Council of Science (ICSU) in South Africa. Nemutudi chairs the Technical Committee of the NMISA board, and also serves as a member of the Finance Committee.

DR RUDZANI NEMUTUDI

Appointed 2013

Non-Executive Director

BProc – University of South Africa
LLB – University of South Africa
Post-graduate Diploma – Labour Law - University of Johannesburg

Mr Nong has extensive experience in labour and employee relations, amassed from his employment in various companies, rising to head of labor relations in Sanlam Life; a role he still assumes to date. He holds professional memberships with the South African Society for Labour Law (SASLAW), the Industrial Relations Association of South Africa (IRASA) and the Northern Province Law Society. Tshokolo is a member of the human resources and the audit and risk committees. Tshokolo is an admitted Attorney of the High Court.

MR TSHOKOLO NONG

Appointed 2013

Non-Executive Director

BA – University Botswana
MBA – University Wales
Diploma marketing (CIM)

Ms Mogadime is co-founder and executive director of Uranus Investment Holdings, a black-empowered company primarily focused on the financial services and ICT sectors. She brings extensive finance and internal audit experience that includes municipal and public-sector bodies in South Africa and the Auditor-General's office of Botswana. Jabu serves on the finance committee.

MS JABU MOGADIME

DR TSHENGEDZENI DEMANA

Appointed 2013

Non-Executive Director

BSc – Denison University - USA
Ph.D – Analytical Chemistry - University of Michigan, USA

Dr Demana is a member of the Technical Committee and Finance Committees of the NMISA board. He has extensive expertise in quality management and governance. Tshenge is the chief director responsible for the policy work in industrial standards and quality at the Department of Trade. He is also a board member of the Chemical Industries & Training Authority.

DR CLEOPAS SANANGURA

Appointed 2013

Non-Executive Director

Doctorate in Business Administration
MSc – Finance and Investment Banking, Corporate Finance and Securities Law - London School of Business and Finance
Doctorate in Business Administration - Nottingham Business School
MSc – Business Administration (Corporate Finance) - Nottingham Business School,
BSc – (Hons) Applied Accountancy - Oxford Brookes.

Dr Sanangura is an acknowledged expert in the areas of finance, corporate strategy, corporate finance, economic research and analysis, corporate risk advisory and corporate governance (investor relations); advising organisations operating or considering investments in emerging markets. He has held a number of senior executive positions in a number of financial institutions. He is the founder and CEO of Dawn Asset Management (Pty) Ltd and Dawn Advisory Services (Pty) Ltd, a leading financial and corporate strategy group based in Johannesburg. He is a member of the Audit & Risk committee and ICT strategic committee.

MS BONGANI MATHEBULA

Appointed 2015

Non-Executive Director

Master – Laws (LLM) with specialisation in commercial law (University of South Africa)

Ms Mathebula is an admitted attorney and conveyancer in good standing. She has vast experience as a corporate lawyer and has since settled into company secretariat duties which she currently performs at SA Express Airways SOC (Ltd) (SAX). She brings with her corporate governance expertise and serves as a member of the Human Resources and Remuneration committee.

Appointed - 2013

Non-Executive Director
Chairperson of Audit and Risk Committee
B.Comm – Accounting
B.Comm Honours (CTA) - Rhodes University
M.Comm – Local and International Tax - University of Johannesburg (RAU)

Ms Molala is the chairperson of the Audit and Risk committee. She is a qualified Chartered Accountant, her career spans from External Auditing, Internal Auditing, Tax Management and currently in Procurement Management. Tshidi has served as an audit committee and/or board member of various state owned entities and Gauteng Provincial Government departments' entities since 2005. She thus has extensive experience in PFMA, drivers of internal control environment and financial controls.

MS TSHIDI MAMADIGA MOLALA CA (SA)

Appointed 2015

Non-Executive Director

BSocSc (University of Natal)
Honours in Personnel Management (University of Natal)
MSc in Development Planning (Wits University)

Ms Ntsubane is the MD of Uluntu Consulting, a Project Management and Strategic Planning firm. She has also held several strategic positions in government, including being a CEO of the CIDB (Construction Industry Development Board) and HOD Economic Development (Ekurhuleni Municipality) She has been in the Development Field for several years working on complex economic infrastructure development projects contributing to job creation, enterprise development and empowerment. She holds an Honours Degree in Personnel Management, and as such is instrumental as Chair of the Remuneration Committee and also chairs the same committee at the Chris Hani Development Agency, of which she is a Board Member.

MS URSULA NTSUBANE

"Fly with your strengths and let other compliment you on your weaknesses"

- Ndwakhulu Mukhufhi, CEO

1.8.2 EXECUTIVE DIRECTORS

MR BENJAMIN VAN DER MERWE

Appointed 2012

Director: Physical Metrology

National Diploma Electrical Engineering

Member of the Consultative Committee for Mass and Related Quantities (CCM)

DR WYNAND LOUW

Appointed 2012

Director: Research, International and Infrastructure Development

PhD – Solid State Physics – UFS

Member of the International Committee of Weights and Measures (CIPM)

President of the Consultative Committee for Ionizing Radiation (CCRI)

Emeritus Chairman of the Cooperation on International Traceability in Analytical Chemistry (CITAC)

Head of the AFRIMETS Secretariat

MS ZAKITHI MSIMANG

Appointed 2012

Director: Ionising Radiation

BSc – Physics and Mathematics, University of Fort Hare
BSc – Honors - Physics, University of Fort Hare
MSc – Physics, University of Witwatersrand

Member of the Consultative Committee for Ionizing Radiation (CCRI)

DR JAYNE DE VOS

Appointed 2012

Director Chemistry and Materials Metrology

ND Chemistry - Pretoria Technikon

NHD Chemistry - Pretoria Technikon

MSc – Applied Chemistry - University of Pretoria

PhD – Chemistry - University of Pretoria

Member of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM)

MS PHETSILE MAGAGULA CA (SA)

Appointed 2015 - Resigned 31 March 2017*

CFO

Postgraduate Diploma – Integrated Reporting - University of Pretoria
Honours Bachelor – Accounting Science - (CTA) University of South Africa
Bachelor of Commerce – Accounting - University of Swaziland
Diploma – Commerce - University of Swaziland

*Mr Ziyaad Adam appointed Interim CFO on 9 May 2017

MR TEBOHO MTHOMBENI

Appointed 2016

N.D Mech Eng – Vaal University of Technology
MDP – Executive Education
N.D Project Management- Damelin
MBA – Regent Business School
Current Studies (PhD Business Management- Davinci Institute)

MS NATASHA NEL-SAKHAROVA

Appointed 2012

Director: Electricity and Magnetism Division

BSc – Physics with Mathematics - University of Pretoria

BA - Economics, Philosophy and Politics – University of South Africa

BSc – Honours – Physics - University of Pretoria

MSc – Physics (with distinction) - University of Pretoria

Member of the Consultative Committee for Photometry and Radiometry (CCPR)

President of the Illumination Engineering Society of South Africa (IESSA)

"Focus on the Wildly Important Goals"

- Ndwakhulu Mukhufhi, CEO
(from The 4 Disciplines of Execution)

1.9 STRATEGIC OVERVIEW

VISION

To be a centre of measurement excellence, inspired to consistently deliver outstanding, innovative and internationally-comparable measurement solutions that support the country's trade, people's quality of life and enable the protection of the environment

MISSION

To provide the South African Industry and environmental, health and safety sectors with fit-for-purpose measurement standards and measurements. This is achieved by keeping and maintaining the national measurement standards to an acceptable international standard; by disseminating traceability to the South African industry; and to ensure the correct application of the Iinternational System of Units (SI) in South Africa.

VALUES

- Measurement excellence
- Social responsibility
- Economic prosperity
- Good governance

1.10 LEGISLATIVE AND OTHER MANDATES

The National Metrology Institute of South Africa (NMISA) was established under the Measurement Units and Measurement Standards Act, No18 of 2006 (The Measurement Act) as a Type 3A Public Entity with a governance board appointed by the Minister of **the dti**, that is the Executive Authority of the NMISA.

To provide for the use of measurement units of the International System of Units (SI) and certain other measurement units; to provide for the designation of the national measurement units and standards; to provide for the keeping and maintenance of the national measurement standards and units and to provide for the establishment and functions of the NMISA.

South Africa is a signatory to the Metre Convention, a treaty dating back to 1875. Under this Convention the International Bureau of Weights and Measures (BIPM) was created to act in matters of world metrology, particularly concerning the demand for measurement standards of ever increasing accuracy, range and diversity, as well as to address the need to demonstrate equivalence between national measurement standards. The International System of Units (SI) was also established under the Metre Convention and is overseen by the International Committee for Weights and Measures (CIPM).

South Africa signed the CIPM Mutual Recognition Arrangement (MRA) in 1999. The CIPM MRA was a response to a growing need for an open, transparent and comprehensive scheme to give users reliable quantitative information on the comparability of national metrology services and to provide the technical basis for wider agreements negotiated for international trade, commerce and regulatory affairs. It is the basis for the international acceptance of national measurement standards and for calibration and measurement certificates issued by National Metrology Institutes (NMIs).

The maintenance, development and improvement of the national measurement standards is mandated in the Measurement Units and Measurement Standards Act, No. 18 of 2006 (The Measurement Act) that was promulalgated to provide for the use of measurement units of the International System of Units (SI) and certain other measurement units; to provide for the designation of the national measurement units (NMS) and standards and to provide for the keeping and maintenance of the NMS and units.

As the custodian of the national measurement units and NMS, NMISA maintains and ensures the appropriate application of the International System of Units (SI) and other measurement units as defined by NMISA in consultation with the measurement community, for the country. NMISA also keeps, maintains and disseminates the gazetted NMS. This role is performed through various products and services and is influenced by the external environment.

The trade of goods and services around the world is the lifeblood of the global economy, and is increasingly important to domestic economic growth, productivity and investment opportunities. For customers to consider trade to be fair and benefit from it, measurements taken in different parts of the world needs to be equivalent to each other, and accepted by each other. Important decisions (economic, social and medical) are based on measurement results. NMISA makes a contribution to all government key priorities and the 14 national outcomes and has aligned its key programmes to the IPAP priority sectors.

Accurate measurement is paramount for fair trade, competitive manufacturing, efficient health care and effective environmental monitoring and law enforcement. NMISA links the South African and regional measurement system to the international measurement system through its participation in the Convention of the Metre and its organs, the CIPM and the BIPM. The expanding global trade and pressure to eliminate technical barriers to trade (TBTs) creates a constant demand for greater accountability and demonstrated competence in NMIs and plays a leading role in the development of a sound metrology infrastructure in Africa, especially in support of South Africa's immediate neighbours in the Southern African Development Community (SADC).

The National Development Plan (NDP) and its flagship programmes for industrial development and research, the Industrial Policy Action Plan (IPAP) and the National System of Innovation (NSI), places exacting demands on NMISA and its contributions to the development of Southern Africa. All activities in NMISA are structured to support our mandate and aim to position NMISA to fulfil its national and regional obligations, as well as to contribute to quality of life at all levels. As one of **the dti**'s four Technical Infrastructure (TI) institutes, NMISA's activities are critical to the success of the other TIs and support national programmes such as the IPAP. Standardisation, metrology, conformity assessment and accreditation are the key components in the implementation of free trade agreements between countries/economic trade blocks.

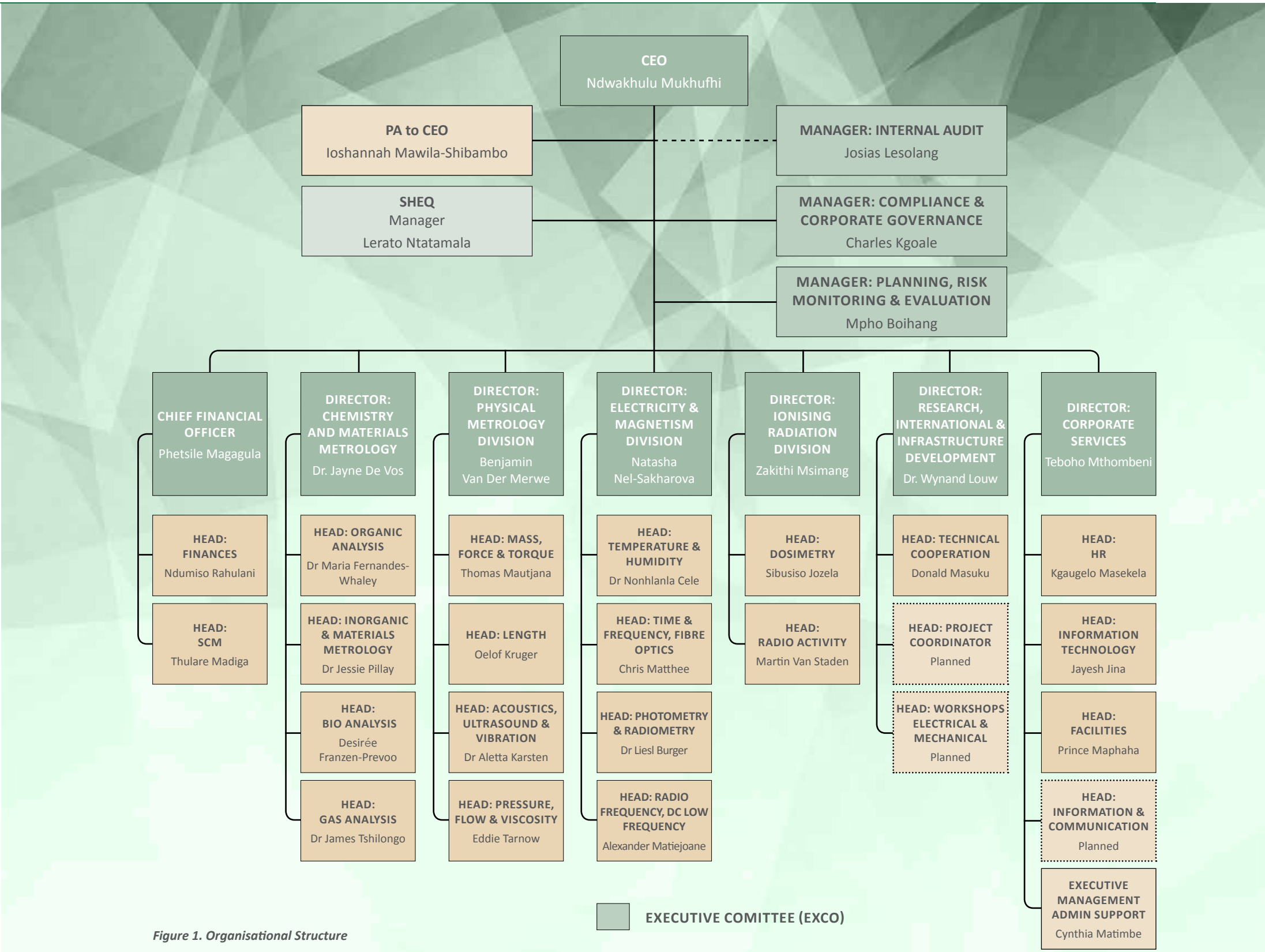


Figure 1. Organisational Structure

PART B

PERFORMANCE INFORMATION

2.1 SITUATIONAL ANALYSIS

2.1.1 SERVICE DELIVERY ENVIRONMENT

The Measurement Act mandates NMISA as the responsible institute for maintaining and disseminating the SI in South Africa, as well as to realise, keep and maintain the National Measurement Standard (NMS). NMISA develops and maintains primary scientific standards of physical quantities for South Africa and compares those standards with other national and international standards to determine their equivalence and ensure global comparability. These standards are disseminated to the South African community through NMISA's range of services and products. Moreover, the institute provides reference analysis in the case of a measurement dispute.

Participation in international activities at Consultative Committee (CC) and Regional Metreology Organisation (RMO) Technical Committee (TC) levels are imperative. These interactions serve to benchmark South Africa's capability to compete in measurement equivalence and impacts directly on NMISA's ability to disseminate traceability for the country.

As one of **the dti**'s four Technical Infrastructure (TI) institutes, NMISA's activities are critical to the success of the other TIs and support national programmes such as the Industrial Policy Action Plan (IPAP). Standardisation, metrology, conformity assessment and accreditation are the key components in the implementation of free trade agreements between countries/economic trade blocks.

NMISA also plays a leading role in the development of metrology infrastructure in Africa, especially in support of South Africa's immediate neighbours in SADC. A sound measurement structure is critical to the successful implementation of regional free trade agreements and elimination of Technical Barriers to Trade (TBT). This role is emphasised in **the dti**'s strategic goals and is South Africa's contribution to the establishment of harmonised regional standards.

2.1.2 ORGANISATIONAL ENVIRONMENT

NMISA manages its technical activities through four technical divisions, namely Physical Metrology, Electricity and Magnetism (EM), Ionising Radiation (IR) and Chemistry and Materials Metrology (ChemMAT), with a cross-cutter division that coordinates Research, International and Infrastructure Development (RIID), including Regional Intergration activities, the liason activities with the TI, the regional metrology organisations (RMOs) and other NMIs. The divisions are supported by a Finance Division, Corporate Services Division and the Office of the CEO.

The technical activities of NMISA are mapped onto the international metrology structures, especially the ten Consultatative Committees of the International Committee of Weights and Measures (CIPM). Thematic research programmes such as materials metrology and environmental metrology allow for the use of expertise from different technical divisions to contribute to national priorities such as nanotechnology, additive manufacturing and environmental monitoring in support of climate change programmes

NMISA adheres to a total quality management system and has identified the regulatory requirements applicable to its services operations and products in order to ensure compliance. NMISA received certification of its OH&S and EMS management system to ISO14001 and OHSAS 18001, which specifies requirements for environmental management systems and occupational health and safety (OH&S) management systems, and almost all the laboratories are accredited laboratories are accredited to ISO/IEC 17025, whilst two of the chemistry laboratories are also accredited to ISO Guide 34 (production of reference materials) and the Organic Analysis Laboratory is anticipating accreditation to ISO/IEC 17043 (providing proficiency testing schemes). The Safety, Health, Environment and Quality (SHEQ) Department handles all matters relating to health and safety of staff, from ensuring a safe working environment to environmental sustainable practises.

2.1.3 STRATEGIC OUTCOME ORIENTED GOALS AND OBJECTIVES

The NMISA is guided overall by **seven goals**, namely:

1	Keep, maintain and develop the national measurement standards and provide for the use of the national measurement units
2	To ensure that the South African measurement system is internationally comparable, by participating in the activities of the International Committee for Weights and Measures as per the Mutual Recognition Arrangement (CIPM MRA)
3	To modernise NMISA's infrastructure and equipment through recapitalisation
4	Provide measurement knowledge and expertise as a key component of the Technical Infrastructure with regard to public policy objectives measurement compliance issues in terms of health, safety and the environment
5	Provide an integrated human capital development programme for metrology
6	Provide essential support to South African public and private enterprises through dissemination of the national measurement standards, units and expertise
7	Adhere to the regulatory requirements of a 3A public entity and sound corporate governance

The NMISA is guided overall by **twelve strategic objectives**; namely

1	Provide for the national measurement units by maintaining the SI units, units outside the SI and equivalents of units
2	Maintain the Schedule of National Measurement Standards
3	Keep, maintain and develop measurement systems for bringing national measurement standards and reference methods into being
4	To ensure internationally recognised and comparable national measurement standards and units by participating in the Metre Convention, CIPM MRA and AFRIMETS activities
5	Establish confidence in the accuracy of the national measurement standards by suitable and documented quality and management systems
6	To maintain the Calibration and Measurement Capability (CMC) claims in the KCDB as internationally peer reviewed evidence of South Africa's measurement capability
7	Recapitalise and modernise the NMISA to ensure that the national measurement standards support international trade, health, environmental and safety requirements
8	As the foundation of the South African measurement system, provide technical measurement expertise and support for public policy objectives, accreditation, standardisation and regulatory affairs
9	To maintain and ensure continued expertise and establish the necessary skills according to internationally acceptable standards
10	Disseminate traceability, measurement expertise and services to the South African public and private enterprises by means of calibration, measurement or analysis, and certified reference materials
11	Provide appropriate technology and skills transfer to the South African industry, especially to SMEs
12	Comply with government directives, the PFMA, Treasury Regulations and regulatory issues in terms of health, safety and the environment and apply good governance.

2.2 PROGRAMME INFORMATION

2.2.1 INTEGRATED VALUE CHAIN

Research that underpins the national measurement standards involves collaborative associations and projects with Government, Science Institutes and Academia and sources external revenue through these collaborative associations and projects. Acknowledging that there is a wealth of analytical need, NMISA consolidated activities and is now focusing on eight thematic thrusts, aligned with IPAP and national priorities that include and support green industries, agro-processing and food safety, enhancing manufacturing competitiveness, improving quality of life through accurate measurement for health care and law enforcement, ensuring consumer protection and shortening the traceability chain for South Africa and the African continent. These thematic thrusts are underpinned by Regional and International integration and maintenance of the national measurement standards.

Measurement thus assists with the improvement of the competitiveness of the South African industry in support of the national strategic initiatives. Important decisions (economic, social and medical) are based on results of measurements. Measurements are part of our daily lives and wrong or inaccurate measurement can result in losses, disagreement between trading partners and can also cause harm to people and the environment; our very survival depends on the ability to measure accurately. The list of potentially hazardous chemicals that we are exposed to (both naturally occurring and anthropogenic) is ever increasing and the lack of analytical services to monitor these environmental toxins is impacting on South Africa's ability to provide comparable data that informs Government needs to address compliance issues that are becoming critical in trade negotiations and overcoming technical barriers to trade (TBTs). Countries and trade regions impose regulations and directives to trade goods, protect the health of their people and the environment. Stricter legislation and the initiation of environmental programs are being applied globally that directly impact the South African people and South African trade.

The technical strategic objectives of NMISA can be linked to the strategic thrusts and are delivered by the Technical Divisions. There is a clear distinction evident to highlight establishment and maintenance of the primary standards to realise the SI units and the secondary standards maintained to transfer the traceability from the primary standard to industry. This traceability chain is realised though calibration, training and technical support and the development and research projects.

To ensure proper coordination of priority projects of national interest and monitoring and evaluation of deliverables in research and development projects, the technical division's activities and deliverables are now captured in a ***matrix organisational structure***. The matrix type organisation is a hybrid- a mix of both the functional and project organisational structures. It provides the project and customer focus of the project structure while it retains the functional expertise of a functional structure; an important element in a field such as metrology.

The projects are organised as multi-disciplinary programmes, coordinated by a research project office, that will deliver outcomes such as improved NMS or measurement solutions to industry. The matrix organisational structure also provides opportunities for people in the functional divisions and sections to pursue career development through assignment to various types of projects within the programmes. This will also allow for easier coordination of student development projects such as NMISA's post-graduate bursary programme.

Measurement underpins everything and, considered in the broadest sense, contributes to the general quality of life. NMISA flagship projects are in support of the nine point plan of the IPAP and the delivery and service environment for NMISA has now been tailored to report against the matrix structure in the form of programmes underpinned by regional integration and maintenance of the national measurement standards.

ENERGY EFFICIENCY	ADVANCED MEASUREMENT SOLUTIONS	REDEFINITION OF THE SI (SHORTENING THE TRACEABILITY CHAIN FOR AFRICA)	MANUFACTURING COMPETITIVENESS
Solid State Lighting Smart Grids Power and Energy ACDC Transfer Difference measurements	Time Reference Signals (Square Kilometre Array)	Watt Balance Avogadro Project Quantum Standards	Thin Film Failure Analysis Dimensional Measurements Additive Manufacturing Torque and Hardness
REFERENCE MATERIALS	**GREEN ECONOMIES**	**QUALITY OF LIFE**	**COMMERCIALISATION**
Matrix Reference Materials Forensic and Environmental Reference materials Mineral Beneficiation Nano Particles	Environmental Monitoring Industrial and Applied Monitoring Contaminants and Nutritional Elements for agro-processing	Health (proteomics) Audit Programme UV Germicidal Index	Law Enforcement Radiation Protection Sale of CRMs Calibration Services

REGIONAL INTEGRATION AND MAINTENANCE OF NATIONAL MEASUREMENT STANDARDS UNDERPIN THE PROGRAMMES THAT FORM THE MATRIX STRUCTURE OF NMISA

2.2.2 ENERGY EFFICIENCY

Clean energy is an integral part of the government's nine-point plan for national economic growth.This relies on energy efficiency as the most important and cost-effective means to mitigate climate change and to improve South Africa's energy security. In order to realise this, energy production and utilisation must incorporate stringent energy efficiency measures.

Accurate energy measurements are crucial in the reduction of energy consumption. Energy is a function of electrical power over a time period, and the national measurement standard for electrical power is maintained by NMISA. This standard currently derives its traceability from overseas. In order to improve the measurement capability, a new primary standard (i.e. fully realised locally) has been designed during the past year and is being built by NMISA. The ac-dc transfer standards constitute a primary element in the establishment of the traceability chain for the ac voltage, current, power and energy calibrations, and are therefore also being improved. Results show that measurement accuracy has improved in the range from 11 µA/A to 27 µA/A and the frequency range can be extended from 10 Hz to 100 kHz. The new capabilities will be submitted for international review and SANAS accreditation.

Smart Grids and new ultra-high voltage transmission, both dc and ac, are rapidly growing areas impacting energy consumption that may require metrological support by NMISA. A feasibility study to investigate the emerging measurement technology requirements of the national electric smart grid has been inititated. Initial studies indicate that the corresponding quantities for which measurement facilities may be necessary to be developed are harmonic power, voltage and current phasors (synchrophasor measurements), current ratios up to 20 kA, voltage ratios up to 1000 kV (dc and ac), and characteristics of switching and lightning impulses.

The phase-out of inefficient lighting is one of the quickest, easiest and most effective ways to save energy and combat climate change. Electricity for lighting accounts for close to 20 percent of total global electricity production and six per cent of worldwide greenhouse gas (GHG) emissions, according to the International Energy Agency. Driven by directives and initiatives from Government, light emitting diodes (LEDs), which are significantly more energy efficient than the conventional incandescent light bulbs, are now increasingly being used in South African homes and public spaces, with the aim of replacing all conventional lighting with LED sources.

Accurate measurement of the photometric and electric properties of LEDs, has played a central role in the successful introduction of LEDs as safe, high quality lighting products, providing a measurable energy saving. NMISA has established its first photometric measurement capabilities for LEDs. These capabilities are currently being developed into internationally verified national measurement standards for LEDs, which will serve as a South African reference for the measurement and calibration of LED light sources. In order to share the information with the lighting industry and other stakeholders, an article on this new measurement facility at NMISA was published in the January 2017 issue of Vector Magazine with the title "NMISA and the new LED national measurement facility".

2.2.3 ADVANCED MEASUREMENT SOLUTIONS

In response to demands from the scientific community, the South African time scale drift has decreased from 5 000 nanoseconds to 20 nanoseconds from the Coordinated Universal Time (UTC), with a corresponding uncertainty decrease from 200 nanoseconds to less than 10 nanoseconds.

NMISA successfully improved the accuracy of the South African Time Scale. Until early 2016, the time scale was allowed to drift with up to five microseconds before an adjustment was made, and was typically a step in the time scale. Since receiving requests from customers in scientific institutes requiring improved accuracy in the time scale, the philosophy was changed in March 2016 and the frequency accuracy was improved. The time scale is also actively steered towards a prediction of UTC. This resulted in a time scale being typically within 20 nanoseconds from UTC during this reporting period. Simultaneously, the uncertainty attached to this offset was improved from 200 nanoseconds to less than 10 nanoseconds. It is expected that this work will result in further improvements in the stability in the next reporting period.

NMISA supports the rapid development of the South African fibre optics and wireless telecommunication systems by providing constantly improving national measurement standards necessary to perform diagnostic network tests with higher accuracy. Chromatic dispersion (CD) and polarisation mode dispersion (PMD) are becoming the limiting factors of modern high-speed systems. These forms of dispersion cause pulse spreading and reduce the capacity for information carrying signals. These effects are inherent in fibre networks and, therefore, need to be measured and counteracted to prevent potential data loss, especially at high bit rates. There are a number of CD analysers in use in the country, that require verification and calibration. Standard reference fibre can be measured and analysed for chromatic dispersion. During the past year, NMISA has established a measuring capability to measure chromatic dispersion and to verify the CD analyser.

2.2.4 REFERENCE MATERIALS

Reliable measurements underpinned by accurate measurement standards are indispensable and ensure that products and services comply with legislation that exists to protect the consumer and our environment. Accurate measurements are vital for the proper functioning of trade and industry, ensuring food safety, appropriate health-care, forensic analysis and environmental monitoring. The cost of measurements often forms a significant part of these sector budgets. The economic impact of these measurement costs is also felt indirectly through the important decisions based on these measurements.

To confidently provide accurate, reliable and comparable measurement results, analytical testing laboratories are required to use various measurement standards, known as reference materials (RMs), for quality control, accuracy assessment, to establish measurement traceability and to demonstrate continued laboratory competence (RMs

used in Proficiency Testing schemes). Use of these materials is prescribed in the ISO/IEC 17025 standard for the competence of testing and calibration laboratories.

Analytical laboratories in Africa are faced with limited funding, infrastructure, and skilled human resources to maintain a sustainable testing environment. When training projects end, quite often so does the funding. The need for more cost-effective methods of analysis has been repeatedly identified. Accessibility to the relevant PT schemes, certified calibration and matrix RMs are limited and costly, but critically needed to ensure comparability of alternative measurement systems/testing protocols.

To address the growing demand for matrix reference materials, NMISA launched the African Food and Feed Reference Material Programme (AFFRMP) in 2015, dedicated to providing measurement support to Food and Feed testing laboratories through the provision of fit-for-purpose Africa-relevant measurement standards such as Certified Reference Materials, Reference materials for Quality Control and Proficiency Testing Scheme purposes.

The reference material programme, which includes the establishment of a RM production facility, will enable trade in support of growth strategies and trade agreements by providing Africa-relevant measurement standards (reference materials) with known quantities and characterised properties to support measurement accuracy and reliability. The facility can now accommodate the production and storage of materials in support of diverse sectors including those for health, forensics, environmental monitoring, metals beneficiation and nano-technologies.

REFERENCE MATERIAL PRODUCITON

During 2016/17 the main objectives for the AFFRMP cross-cutter project were to consolidate stakeholder information, thus providing direction for future reference materials production, and to continue to establish the necessary infrastructure required to produce, homogenise, package and store matrix reference materials. This required the renovation of an existing air-conditioned workshop to accommodate the new reference material production equipment procured as part of NMISA's recapitalisation project. Procurement included the 3D kinematic inversion mixer, freeze drier and the patented state-of-the art modern mixing technology – the Resodyn™ Acoustic® Mixer (RAM 5). NMISA is the first institution in the Southern Hemisphere, South America, Africa and Asian continents to own a production scale RAM 5 acoustic mixing system. Two staff members participated in the Resodyn™ Technical Interchange, followed by certification training and factory acceptance testing of the RAM 5 system commissioned at NMISA. The interchange facilitated the forging of networks with industry members already applying the technology, including nanotechnology, pharmaceuticals, and energetics (explosives and rocket fuels). The technical interchange repeatedly highlighted the scientific impact of owning the RAM technology, as the scope for patenting new materials and new coating technologies is immense.

Stakeholders were invited to the launch of the RAM 5 to understand the mixing possibilities that are achievable using the acoustic mixer, in addition to the supporting measurements available at NMISA, such as nanoscale scanning electron microscopy and x-ray diffraction, that would be able to assist with the characterisation of novel materials that can be mixed on the acoustic system in any of the industry sectors represented, including cosmetics, energetics, pharmaceuticals, polymers, ceramics and nanomaterials.

NMISA MOUs WITH NIM CHINA AND CSIR BIOSCIENCES

A memorandum of understanding (MoU) was signed between NMISA and NIM China for technical cooperation on Mycotoxin matrix certified reference material (CRM) production. NMISA visited the institution during 2016 to learn how best to establish and maintain a reference material facility, including best practices for material processing and production. The visit also confirmed the technical cooperation framework agreement over the next four years. NMISA has now submitted a Declaration of Intent in support of a Joint Proposal by NIM China, NMISA and the BIPM to the International Cooperation Fund (ICF) of the Ministry of Science and Technology (MOST) of China to collaborate on a project entitled "*Demonstration Research and Mutual Recognition of Measurement Standards and Technological Systems for Agro-product Safety*". The ICF aims to strengthen the construction of International Science and Technology Cooperation Bases, create more medium and long term joint study opportunities, deal with global challenges through innovative cooperation on science and technologies, and meet the UN's 2030 Agenda for Sustainable Development. The project will focus on international mutual recognition for measurement standards and technical systems for mycotoxins in grain, improved measurement capacity, and the establishment of a global metrology system for food safety. This project will be led by NIM, and carried out between NIM, BIPM, NMISA and countries along "the Belt and Road".

NMISA has also entered into a collaboration with the CSIR which was formalised through an overarching memorandum of agreement signed in 2016/17. The agreement will initially focus on the production, isolation, and purification of the "big-5" mycotoxins (aflatoxin B1, B2, G1, G2 and M1) by the CSIR BioSciences Division for exclusive supply to NMISA for certification and distribution. NMISA is now well positioned to make a difference to the measurement community, not only through measurement standards but also through the transfer of skills required to ensure accurate, reliable and comparable measurements that ensure the safety and quality of our food and feed.

2.2.5 GREEN ECONOMY MEASUREMENT TOOLS

Pollution is recognised as a consequence of anthropogenic activity that is harmful to the environment and human health, and can be divided into a number of sub-categories: water, air, soil, thermal, radioactive, noise and light pollution as well as the newest addition, nanoparticle pollution. Pollution is also a barrier to trade as stricter international policies and legislation effectively reduce or stop exports of commodities and consumer products. South Africa committed to the National Framework for Sustainable Development in 2008 and this commitment includes managing limited ecological resources while safeguarding the population. One of the initiatives being spearheaded is Green Economy which is focused on providing economic growth in the "green" industry section while moving towards a cleaner industrial sector, and lower environmental impact overall. NMISA has invested in analytical capacities in support of Green Economies over the last few years which has culminated in the successful participation in numerous international comparisons within the 2016/17 financial year.

The South African government promotes activities focusing on the research, development and the industrialisation of solar energy to improve the quality of life for South Africans and to preserve and/ or restore the environment. Aligned to South Africa's Green Industry initiative, **the dti** focuses on advanced manufacturing and the creation of "green jobs" that will drive the creation and growth of solar energy based industries. Accurate measurement is central to the success of **the dti**'s goals to promote green. In response, NMISA has invested in projects under its Green Economy Measurement Tools programme to develop the metrology and standards that will provide a strong framework for current and new solar energy based industries to flourish.

ANALYTICAL CAPABILITIES

NMISA has developed additional benchmarked analytical capabilities for the analysis of perfluorinated compounds, dioxins and brominated flame retardants. These capacities were successfully benchmarked by participation in the United Nations Environmental Programme (UNEP) Biennial Global Interlaboratory Assessment on Persistent Organic Pollutants. Successful participation in this assessment has reinforced South Africa's position as a leader in the development of analytical capabilities within Africa. These methods will be used in future to value-assign certified reference materials (CRMs), as well as to assist in reference measurements for industry and research institutions.

PHOTOVOLTAIC NANOMATERIALS

The generation of electrical power from renewable sources such as solar energy is one of the key contributors to the success of a Green Economy. The natural abundance of sunlight in South Africa serves as extra motivation to invest in solar energy as a viable alternative to reduce our dependence on fossil fuel sources. The synthesis and characterisation of the Photovoltaic nanomaterials project is a collaborative effort that aims at developing the measurement capabilities required throughout the lifetime of a solar cell, from the synthesis of its components to the device fabrication, for upscaling manufacturing from laboratory scale to industry scale, and for the eventual 'performance monitoring' of the device while in operation. The project has focused on understanding the relationship between the synthesis, material structure and the optoelectronic properties of thin films, nanostructured and organic materials. These advanced materials are expected to be technologically superior to their bulk counterparts, and serve as low cost alternatives to the current materials used to generate electricity from solar energy. A key sub-project during 2016/17 focussed on the application of silicon nanowires to improve the optoelectronic properties of organic photovoltaics. If successful, the resulting organic-inorganic material within a photovoltaic cell will use less expensive silicon than the current bulk crystalline silicon based photovoltaics. The doping of intrinsic advanced materials, interactions at material interfaces, and the resulting optoelectronic properties are key focus areas for three post graduate studies (one PhD and two MSc degrees) that included presentations and papers at local conference;, one of which won the student prize for best presentation.

NEW PRIMARY REFERENCE GAS MIXTURES

Volatile Organic Compounds (VOC's) are measured throughout the world because of their contribution to the environment as ozone precursors. NMISA supports programs such as the World Meteorological Organisation Global Atmospheric Program (WMO/GAW) by developing VOCs and greenhouse gas reference materials and has successfully developed gas standards for benzene, toluene, ethyl benzene and xylenes (BTEX; from 30 to 2 µmol/mol) to provide traceability for the analysis of these pollutants that are produced by the petroleum industry. The new primary reference gas mixtures have been available to the industry since July 2016.

As part of the recapitalization project, NMISA has commissioned the new fully Automated Weighing System (AWS), developed by the Korean Research Institute of Standards and Science (KRISS). With the new AWS, NMISA can now weigh cylinders having a volumetric capacity of up to 10 L. The system is much easier to use, much faster, and is highly precise. Two or three cylinders can be measured serially. Date, time, pressure, temperature and relative humidity are all automatically recorded and the standard deviation of the response has resulted in an order of magnitude improvement on the uncertainty for primary gas reference mixtures compared with the previous system. This will have a positive impact in providing measurement traceability to the local industries, for example, air pollution monitoring, and the medical health sector.

2.2.6 REDEFINITION OF THE SI

The international definition of the kilogram in the International System of Units (SI) has not been changed since 1889. The kilogram (unit of mass) is defined as the

mass of a Platinum- Irridium (Pt-Ir) alloy cylinder that has been kept at the International Bureau of Weights and Measures (BIPM) in Paris, France since 1889. The mass piece is called the international prototype of the kilogram (IPK). All mass measurements done under the SI are traceable to the IPK. The main disadvantage of this definition is the long-term stability of the mass of the Pt-Ir artefact. The kilogram is also the only SI unit still based on an artefact.

In 1995 the international community decided to redefine mass in terms of Planck's constant. The two main technologies that will be used in the re-definition are the Watt balance (where electrical power is compared with mechanical power) and the silicon (Si)-sphere (determining the number of atoms in a high purity silicon sphere). The final date for the re-definition was declared as 2018. In 2016, NMISA decided to invest in the two technologies that will be used in the re-definition, namely the Watt balance and the Si-sphere.

In June 2016, the CEO of NMISA renewed the MoU with the Director of the PTB in Germany. Under this umbrella agreement, the PTB offered the use of a Si-sphere to NMISA for a period of one year from the middle of 2017.

NMISA visited three NMI's in the process to fast-track the Watt balance project. The National Physical Laboratory (NPL) in the UK, approached NMISA with a proposal to join their program in the development of a Table-top Watt Balance.

2.2.7 MANUFACTURING COMPETITIVENESS

The manufacturing sector, according to **the dti** annual report, is the largest single sector with the gross value add of around 25% of the total for South Africa. With this in mind, NMISA initiated a project focusing on machine tool evaluation, which is inclusive of Computer Numeric Control (CNC) milling machines and lathes. To perform measurements at the required level, a high accuracy laser tracer was procured. The accuracy of this instrument allows not only for machine tools to be calibrated but also coordinate measuring machines (CMMs). During January, the laser tracer system was delivered, commissioned and training received. Before any projects for industry will commence, the machine tools in NMISA's workshop will be calibrated to gain experience and ensure the necessary expertise before offering the service to industry.

Additive manufacturing, or 3D printing as most of us know it, is currently the buzz word in manufacturing. These printers cover a range of uses from the hobbyist, to printers that cost in the region of R10 000, up to provisional printers where the costs of these printers run over millions of Rand. This industry is estimated to be 2 billion US$ and is expected to grow to over 20 billon US$ by 2020. One advertising line states that 3D printing is "What dreams are made of".

With this as background, NMISA initiated a project to research this industry since NMISA has a multipurpose role in this industry:

1) Routine measurements in support of printed parts. Parts printed by industrial printers are measured for material characterisation, surface texture and dimensions.
2) NMISA's dimensional section designed a part which is used to evaluate the dimensional accuracy of a printer. The part will be printed by an industrial printer, after which NMISA will measure the dimensions and compare them to the original design. These measurements will be used to "grade" the printer or improve the printer.
3) The section designed and built a printer to be more accurate than normal printers to be used as a measuring system, during printing, layer-for-layer, or as a stand-alone measuring system.
4) Lastly, NMISA purchased various printers to be used to print/ manufacture prototypes and final products for measuring systems, or parts to be used in NMISA. The line scale camera/ encoder holder and the Tribor calibration system were printed using 3D printer technology.

2.2.8 QUALITY OF LIFE

Quality of Life is defined as the general well-being of individuals and societies, outlining negative and positive features of life. The programme aims to cover aspects of health and safety, both environmentally and medically. Measurement error and/ or human diagnostic error poses a high risk to the health and safety of humans seeking outpatient medical care. Since effective treatment depends upon an accurate and effective diagnosis, misdiagnosis can also lead to inappropriate or unnecessary testing, and treatment that may cause harm and is costly. The various projects aim at decreasing measurement errors by providing traceability and measurement expertise.

Traceability in radiation therapy is currently provided by means of absorbed dose to water using a Co-60 gamma radiation source. NMISA, through its recapitalisation project, has replaced an outdated Co-60 irradiation system. The new system was installed and commissioned and provides a more efficient and reliable calibration service to the radiation therapy community in South Africa and the region, contributing towards quality cancer care. With the assistance of the International Atomic Energy Agency (IAEA), NMISA also established a function to audit dose measurements in radiotherapy centres. This, not being a regulatory function, is to ascertain the quality of measurements and treatment delivery at radiation therapy centres. NMISA successfully conducted onsite audits on five hospitals that were part of the pilot study. This pool included both public and private hospitals. NMISA received training from the IAEA to establish the audit programme especially for postal audit. The training was on the Radiophotoluminescent (RPL) dosimetry system that the IAEA had procured for NMISA through government sharing. This system has now been installed and commissioned and is now in the process of characterising the chips used with the system. The postal audit will replace the IAEA/WHO audit that the hospitals are participating in, making the service readily available.

2.2.9 COMMERCIALISATION

As part of consolidating the sale of reference materials and providing calibration and measurement services, NMISA is focussing efforts to ensure that revenue generation is prioritised and streamlined. The aim is to provide industry with measurement solutions where possible. A number of MoUs have been signed and this also ensures improved client service to industry.

2.2.10 REGIONAL INTEGRATION

NMISA plays a leading role in the development of metrology infrastructure in Africa, especially in support of South Africa's immediate neighbours in SADC. This is crucial for the successful implementation of regional free trade agreements. This role is emphasised in **the dti**'s strategic goals and the South African contribution towards mutual acceptance of testing results in the region. NMISA is one of the founder members of the regional metrology organisation (RMO) for Africa, and the Intra-Africa Metrology System (AFRIMETS) that are made up of the members of the sub-RMOs in Africa that are based on the economic blocks (for example SADCMET for SADC, EAMET for EAC, etc.). NMISA holds the secretariats of both SADCMET and AFRIMETS and, as the NMISA has membership of nine of the ten Consultative Committees (CC), NMISA provides the link for AFRIMETS to the technical activities at the international level.

In 2016/17 NMISA obtained access to the 10th Consultative Committees for Units (CCU), through the presidency of the CC for Ionising radiation (CCRI) as all presidents of CCs may attend the CCU. This provides an important avenue for input to the revision of the International System of Units, the SI, (expected by 2018) and improves the communication to African NMIs.

PRODUCTS

NMISA saw a decrease in revenue from blood alcohol analysis CRMs, due mainly to the surplus procured in 2015/16 by the National Department of Health (NDoH). In March, a proposal was submitted to the NDoH aimed at streamlining the procurement of NMISA CRMs and PT schemes through a three-year contract that allows for scheduling and delivery of CRMs to avoid delays in service delivery for both the NDoH and NMISA.

NMISA's revenue grew in the 2016/17 financial year with the selling of primary reference gas mixtures including the calibration of ozone and reference analysis of gases. The reference gas mixtures include production of hydrogen sulphide, sulphur dioxide, nitric oxide, nitrogen dioxide, ethanol, carbon dioxide, carbon monoxide in a matrix of nitrogen or air and multicomponent stack gas mixtures.

SERVICES

The list of emerging and persistent organic pollutants being regulated internationally and locally is ever increasing. It has become increasingly difficult for routine laboratories to keep up with the demands of unusual niche analysis. Where no local capability exists and where analytical services are not routinely performed, NMISA's collaboration with universities and other research institutions is useful in establishing these methodologies. In 2013, NMISA was approached by the North West University (NWU) to assist with the analysis of perfluorinated compounds in environmental matrices. Initial analysis performed internationally indicated that high levels of these compounds are found in the South African environment. This collaboration formed part of a PhD project, which was concluded in 2016.

NMISA is involved in a long-term project with the University of Pretoria's Faculty of Health Science's Urology Department: Environmental Chemical Pollution and Health Research Unit. This project focuses on monitoring the levels of pesticides and pesticide metabolites in humans through urine analysis in communities where malaria control programmes have been implemented.

The calibration of gas monitors has grown during 2016/17 due to an increased demand for these services. Calibration services provided to industry included the calibration of evidential breath analysers, ozone analysers, and reference analyses that include greenhouse gases.

SMALL BUSINESS DEVELOPMENT

In line with **the dti** objectives, NMISA identified a strategic need to collaborate with the National Small Business Chamber (NSBC) and other national Small and Medium Enterprises (SMEs) development agencies such as SEDA in creating awareness among local companies and SMEs in the manufacturing sector of the importance of measurements, calibration and NMISA support for SME development and enhanced competitiveness.

As part of this plan, NMISA exhibited at the "My Business Expos for SMEs" organised by NSBC, which are aimed at the development of SMEs. The Expos were organised in four provinces namely, Gauteng (Johannesburg), KwaZulu-Natal (Durban), Eastern Cape (Port Elizabeth) and Western Cape (Cape Town). NMISA used this opportunity to distribute information leaflets on its activities and demonstrate the SME DVD to a number of SMEs on the importance of measurements in their respective businesses and markets as well as the imperative need to calibrate their instruments to ensure that their products and processes meet the necessary quality standards. Courtesy visits were also arranged to the accredited calibration laboratories during these Expos to create awareness and also to get valuable feedback on the measurement needs of the industries. Training is also provided to SMEs using the SME metrology toolkit developed by NMISA which is a measurement practice guide that gives guidance that empowers companies to instill good measurement practices and enables the SMEs to improve their competitiveness in the various industries. More than fifty SMEs, mainly from the manufacturing sector, have been trained on the SME DVD, the metrology toolkit and how best NMISA can assist them with their measurement needs.

NMISA has procured 'state-of-the-art' seperation science equipment to ensure that accurate and equivalent measurements can be performed in support of the Reference Materials and Reference Measurement solutions offered to industry.

NMISA's laboratories participate in international benchmarking exercises organised by the CCs and WGs, establishes the equivalence of NMISA's national measurement standards to the SI and then organises benchmarking (comparisons) of African NMI measurement standards. More than 35 technical measurement parameters were completed over the past three years. NMISA thus provides traceability to all SADC NMIs and most of Sub-Saharan Africa and calibrates the NMS of these NMIs and is also requested and contracted to provide training for their metrologists.

NMISA represented AFRIMETS at the Pan African Quality Infrastructure (PAQI) 9th joint committee meeting in February 2017, in Rwanda. The PAQI meeting was followed by a workshop for the continental free trade area (CFTA) negotiators. The PAQI institutions (ARSO-standards, AFRAC-accreditation, AFSEC-electrotechnical standards and AFRIMETS-measurement standards) were requested to present on their areas and the role of the QI in a CFTA. A presentation on metrology and its role in trade was given to the CFTA workshop. Even though it was done under the AFRIMETS umbrella, it provided good exposure to NMISA and strengthened its leadership in its metrology position on the African continent. The practical outcome is that many countries requested NMISAs to provide contact details for assistance with training and calibration of national standards. During 2016/17 more than 70 metrologists from NMIs and SMEs in the region, were trained.

2.3 PERFORMANCE INFORMATION

NMISA has adopted the balanced scorecard approach to set and measure performance targets. The NMISA Scorecard is composed of four key components, namely stakeholder/ customer, learning and growth (organisational development), innovation and business processes and financial perspective.

2.3.1.1 SCORECARD OUTLINE

STAKEHOLDER AND CUSTOMER PERSPECTIVE	• Trusted business partner and service excellence • Improved turnaround time and response time • Increase customer satisfaction, thereby increasing referrals
LEARNING AND GROWTH (ORGANISATIONAL DEVELOPMENT) PERSPECTIVE	• Improve staff qualification profile • Transformation (establish pipeline of future skills) • Create management systems (career ladders, performance management etc.) • Communication (staff meetings, section head forum, staff communique etc.)
INNOVATION AND BUSINESS PROCESSES	• Establish long-term multi-divisional anchor research programmes • Implement systems to manage and protect NMISA IP • Align and integrate systems and processes
FINANCIAL PERSPECTIVE	• Financial growth and stability (broaden revenue mix) • Effective financial controls • Decrease costs of delivered products and services

An updated balanced scorecard has been included below. Quarterly targets have been defined for 2016/17, and targets have been maintained as per the signed-off Annual Performance Plan.

2.3.1.2 NMISA SCORECARD

PERFORMANCE INDICATOR	ACTUAL ACHIEVEMENT 2015/16	PLANNED TARGETS 2016/17	ACTUAL ACHIEVEMENT 2016/17	VARIANCE FROM PLANNED TARGETS ACTUAL ACHIEVEMENT FOR 2016/17	COMMENTS ON VARIANCE
NATIONAL OBLIGATIONS					
STRATEGIC OBJECTIVES 1: PROVIDE FOR THE NATIONAL MEASUREMENT UNITS BY MAINTAINING THE SI UNITS, UNITS OUTSIDE THE SI AND EQUIVALENTS OF UNITS					
Gazetted national measurement units	Final Schedule 2 submitted for Gazetting. Corrected Schedule 3 also, submitted to **the dti**	Update schedule 3 (equivalents of units) and submit to **the dti** to gazette	Update schedule 3 (equivalents of units) submitted in Q1	None	None
STRATEGIC OBJECTIVES 2: MAINTAIN THE SCHEDULE OF NATIONAL MEASUREMENT STANDARDS					
Number of national measurement standards maintained, submitted to **the dti** to Gazette	56	54	56 maintained	2	Following the resolution by the Directors of the NMIs to shorten the review process from 24 to 18 months, most targets were met before time.

PERFORMANCE INDICATOR	ACTUAL ACHIEVEMENT 2015/16	PLANNED TARGETS 2016/17	ACTUAL ACHIEVEMENT 2016/17	VARIANCE FROM PLANNED TARGETS ACTUAL ACHIEVEMENT FOR 2016/17	COMMENTS ON VARIANCE
STRATEGIC OBJECTIVE 3: KEEP, MAINTAIN AND DEVELOP MEASUREMENT SYSTEMS FOR BRINGING NATIONAL MEASUREMENT STANDARDS AND REFERENCE METHODS INTO BEING					
Number of improved national measurement standards and secondary standards reference materials and methods	29	15	18	3	NMISA finalised three improved NMS earlier than planned (completion planned for 2017/18)
STRATEGIC OBJECTIVE 4: TO ENSURE INTERNATIONALLY RECOGNISED AND COMPARABLE NATIONAL MEASUREMENT STANDARDS AND UNITS BY PARTICIPATING IN THE METRE CONVENTION, CIPM MRA AND AFRIMETS ACTIVITIES					
Number of memberships of International committees for Weights and Measures CIIPM and Consultative Committees (CC)	10	10	10	None	None
STRATEGIC OBJECTIVE 5: ESTABLISH CONFIDENCE IN THE ACCURACY OF THE NATIONAL MEASUREMENT STANDARDS BY SUITABLE AND DOCUMENTED QUALITY AND MANAGEMENT SYSTEMS					
Number of accredited laboratories accredited to ISO 17025 or ISO Guide 34 and/or maintained quality system	20	20	20	None	None
STRATEGIC OBJECTIVE 6: TO MAINTAIN THE CALIBRATION AND MEASUREMENT CAPABILITY (CMC) CLAIMS IN KCDB AS EVIDENCE OF SOUTH AFRICA'S MEASUREMENT CAPABILITY					
Number of CMCs as published in the Key Comparison Database (KCDB)	415	417	475	58	The KCDB database counts multi-component gas mixtures as single mixtures; therefore, a multi-component mixture consisting of 4 components is counted as 1 CMC. In April 2016, the CCQM Gas Analysis Working Group changed the rules and is now counting each component as a CMC. The discrepancy between the number of CMCs is the new counting method and additional gas CMCs submitted and reflected in the KCDB that were approved during the cycle.
STRATEGIC OBJECTIVE 7: RECAPITALISE AND MODERNISE THE NMISA TO ENSURE THAT THE NATIONAL MEASUREMENT STANDARDS SUPPORT INTERNATIONAL TRADE, HEALTH, ENVIRONMENTAL AND SAFETY REQUIREMENTS					
Percentage of budget spent (see note*)	104%	100%	98%	-2%	NMISA instigated a rigorous process to ensure cost-effectiveness of tender awards. The resultant negotiations with single suppliers of highly advanced equipment supplied by other National Metrology Institutes and Original Equipment Manufacturers, as well as the improvement in the exchange rate in the period November 2016 to March 2017, yielded substantial savings.

PERFORMANCE INDICATOR	ACTUAL ACHIEVEMENT 2015/16	PLANNED TARGETS 2016/17	ACTUAL ACHIEVEMENT 2016/17	VARIANCE FROM PLANNED TARGETS ACTUAL ACHIEVEMENT FOR 2016/17	COMMENTS ON VARIANCE
STRATEGIC OBJECTIVE 8: AS THE FOUNDATION OF THE SOUTH AFRICAN MEASUREMENT SYSTEM, PROVIDE TECHNICAL MEASUREMENT EXPERTISE AND SUPPORT FOR PUBLIC POLICY OBJECTIVES, ACCREDITATION, STANDARDISATION AND REGULATORY AFFAIRS					
Number of memberships of SANS STCs, ISO/SANS Committees and NRCS regulatory bodies	45	46	59	15	Increased national demand, especially for lighting applications (with, for example, 17 SABS committees). Lighting is a dynamic environment and the technology adapts to improvements in electronic technology or with the development of new technology (e.g. LEDs). The LED market is fast growing and products are evolving at a fast rate. The IEC is therefor very active in this field.
Number of refereed and/or peer-reviewed papers, manuscripts, articles, application or technical notes, book chapters, etc. accepted for publication in peer-reviewed journals, books or appropriate media	22	22	35	13	Most Divisions had an opportunity to submit additional papers for publication and were accepted and published.
Number of presentations given at conferences, workshops and TAFs	43	44	85	42	Divisions had the opportunity to present additional posters and orals at the planned conferences, TAFs and workshops attended during the financial year
STRATEGIC OBJECTIVE 9: TO MAINTAIN AND ENSURE CONTINUED EXPERTISE AND ESTABLISH THE NECESSARY SKILLS ACCORDING TO INTERNATIONALLY ACCEPTABLE STANDARDS					
Number of post-graduate and undergraduate bursars	14	12	17	5	NMISA had extra funds to build up their Human Capital Development.
Training expenditure as a % of personnel cost	2%	2%	5.9%	3.9%	Additional funds were allocated to staff training on new instruments procured as part of the recapitalisation project
Number of interns and in-service trainees hosted	10	10	20	10	Interns are appointed on an annual contract, some leave before the end of the contract, this allows NMISA to train more interns when they are replaced.
Percentage of funded vacancies	8%	8%	7%	None	None
STRATEGIC OBJECTIVE 10: DISSEMINATE TRACEABILITY, MEASUREMENT EXPERTISE AND SERVICES TO SOUTH AFRICAN PUBLIC AND PRIVATE ENTERPRISES BY MEANS OF CALIBRATION, MEASUREMENT OR ANALYSIS, CERTIFIED REFERENCE MATERIALS					
Income generated from dissemination activities	R11 918m	R10 487m	R12 089m	R1 602m	More reference materials sold in the year than expected.
Percentage of complaints from customer satisfaction survey per total jobs	1.2	≤5	0.33%	None	None

PERFORMANCE INDICATOR	ACTUAL ACHIEVEMENT 2015/16	PLANNED TARGETS 2016/17	ACTUAL ACHIEVEMENT 2016/17	VARIANCE FROM PLANNED TARGETS ACTUAL ACHIEVEMENT FOR 2016/17	COMMENTS ON VARIANCE
STRATEGIC OBJECTIVE 11: PROVIDE APPROPRIATE TECHNOLOGY AND SKILLS TRANSFER TO THE SOUTH AFRICAN INDUSTRY, ESPECIALLY TO SMES					
Number of industry and or regional metrologists trained in accurate measurement	81	59	146	87	The regional Water proficiency testing scheme was more successful than anticipated
Number of courses presented to industry	18	14	17	3	Opportunities were presented to NMISA to present more courses
STRATEGIC OBJECTIVE 12: COMPLY WITH GOVERNMENT DIRECTIVES, THE PFMA, TREASURY REGULATIONS AND REGULATORY ISSUES IN TERMS OF HEALTH, SAFETY AND THE ENVIRONMENT AND APPLY GOOD GOVERNANCE.					
Percentage of revenue received expensed	100%	98%	98%	None	None.
Percentage of total budget spent on CAPEX	60%	20%	44%	24%	The organisation re-prioritised its capital expenditure to procure capital items that take a significant amount of time to manufacture and install.
Completed Annual Audit Plan and follow-up audits as approved by Audit and Risk Committee	83%	100%	100%	None	None

Regina Mnguni, from the Tempretaure and Humidity section, checking the condensate layer on the mirror of the dewpoint meter.

Edwin Mofokeng, from the Photomerty and Radiometry section, using a Spectrophotometer for measurement of spectral properties of materials.

PART C
GOVERNANCE

3.1 INTRODUCTION

Corporate governance is an exercise of ethical and effective leadership by the NMISA Board towards effectively achieving the controls as outlined in King III. These include the need for an annual integrated report that focuses on the impact of the organisation in the economic, environmental and social spheres, a statement by the audit committee to the board and shareholders on the effectiveness of internal financial controls to be included in the integrated report, the consideration of the strategic role of IT and its importance from a governance perspective, the positioning of internal audit as a strategic function that conducts a risk-based internal audit and provides a written assessment of the company's system of internal control, including internal financial controls and the governance of risk through formal risk management processes.

3.2 EXECUTIVE AUTHORITY

Dr Rob Davis, MP, Minister of Trade and Industry

3.3 THE ACCOUNTING AUTHORITY/ BOARD CHARTER

The purpose of this document is to set out the mission, duties and responsibilities of the Board of Directors of the National Metrology Institute of South Africa (NMISA). The Board of Directors is the NMISA's Accounting Authority in terms of the Public Finance Management Act, No 1 of 1999 (PFMA). A summary of the contents of this Board Charter will be disclosed in the NMISA's annual report.

As recommended by the King Code, the Board has a charter setting out its responsibilities, which should be disclosed in its annual report. At a minimum, the charter should confirm:

- The board 's responsibility for the adoption of strategic plans,
- Monitoring of operational performance and management,
- Determination of policy processes to ensure the integrity of the public entity risk management and internal controls,
- Communication policy, and director selection, orientation and evaluation

3.3.1 THE BOARD

The Board of Directors consists of the following non-executive individual members:

NAMES	DATE OF APPOINTMENT	DESIGNATION	TOTAL NO. OF MEETINGS	TOTAL NO. OF MEETINGS ATTENDED
Dr Prinsloo Nevhutalu	05/04/2013	Chairperson	7	7
Mr Thembani Bukula	05/04/2013	Member	7	5
Ms Tshidi Molala	05/04/2013	Member	7	5
Dr Rudzani Nemutudi	05/04/2013	Member	7	7
Dr Tshenge Demana	05/05/2013	Member	7	7
Ms Jabu Mogadime	05/04/2013	Member	7	5
Mr. Ndwakhulu Mukhufhi	01/09/2013	CEO	7	7
Mr. Tshokolo Nong	05/04/2013	Member	7	3
Ms Bongani Mathebula	01/10/2015	Member	7	4
Ms Ursula Ntsubane	01/03/2015	Member	7	7
Dr Cleopas Sanangura	05/04/2013	Member	7	7

3.3.2 SUB-COMMITTEES OF THE BOARD

- Audit and Risk Committee
- Finance Committee
- Technical Committee
- Human Resource and Remuneration Committee

3.3.2.1 Audit and Risk Committee

NAMES OF MEMBERS	DESIGNATION	TOTAL NUMBER OF MEETINGS HELD	TOTAL NUMBER OF MEETINGS ATTENDED
Ms Tshidi Molala	Chairperson	6	4
Ms Poni Ngwato	External Member	6	1
Mr Kgosietsile Kgosiemang	External Member	6	6
Dr Cleopas Sanangura	Member	6	3
Mr Ndwakhulu Mukhufhi	CEO	6	6
Ms Ursula Ntsubane	Member	6	6
Mr Tshokolo Nong	Member	6	4

3.3.2.2 Finance Committee

NAMES OF MEMBERS	DESIGNATION	TOTAL NUMBER OF MEETINGS HELD	TOTAL NUMBER OF MEETINGS ATTENDED
Mr Thembani Bukula	Chairperson	5	2
Mr Ndwakhulu Mukhufhi	CEO	5	4
Dr Rudzani Nemutudi	Member	5	4
Ms Jabu Mogadime	Member	5	5
Dr Tshenge Demana	Member	5	5

3.3.2.3 Technical Committee

NAMES OF MEMBERS	DESIGNATION	TOTAL NUMBER OF MEETINGS HELD	TOTAL NUMBER OF MEETINGS ATTENDED
Mr Ndwakhulu Mukhufhi	CEO	5	5
Dr Rudzani Nemutudi	Chairperson	5	5
Dr Tshenge Demana	Member	5	4
Ms Bongani Mathebula	Member	5	0

3.3.2.4 Human Resources and Remuneration Committee

NAMES OF MEMBERS	DESIGNATION	TOTAL NUMBER OF MEETINGS HELD	TOTAL NUMBER OF MEETINGS ATTENDED
Mr Ndwakhulu Mukhufhi	CEO	5	5
Ms Ursula Ntsubane	Chairperson	5	5
Mr Tshokolo Nong	Member	5	4
Ms Bongani Mathebula	Member	5	3

3.3.3 RISK MANAGEMENT AND INTERNAL CONTROL

Legislating the implementation of risk management in public sector institutions is part of a macro strategy of the South African government which aims to ensure achievement of public sector institutional goals and objectives. This mandate of the NMISA can be found in Section 76 of the Public Finance Management Act, 1999 (Act 1 of 1999) as amended by Act 29 of 1999, Treasury Regulations TR3.1.10, and Treasury Regulations TR3.1.13. Risk management therefore forms an integral part of the Institute's plan to deliver effectively and efficiently on its mandate.

The Board is responsible for determining the policies and processes necessary to ensure the integrity of risk management and internal controls. The Board must ensure that a formal risk assessment is undertaken annually to identify and evaluate key risk areas. The Board must also ensure that it continually reviews and forms its own opinion on the effectiveness of the risk management process.

A Board committee or a risk management committee will assist the Board in reviewing the risk management process and the significant risks facing the NMISA.

The Board's risk management policy should be clearly communicated to all employees to ensure that the risk strategy of the Board is incorporated into the language and culture of the NMISA. NMISA continues to recognise the importance of risk management to ensure realisation of objectives and therefore endeavours to comply with legislation as it pertains to its risk management.

3.3.4 INTERNAL AUDIT AND AUDIT COMMITTEE

3.3.4.1 Key activities and objectives of internal audit

NMISA established an Internal Audit Unit in line with the PFMA and Treasury Regulations. Internal Audit is an independent, objective assurance and consulting activity, established to add value and improve NMISA operations. It assists the NMISA to accomplish its objectives by bringing a systematic and disciplined approach to evaluate and improve the effectiveness of risk management, internal control and governance processes.

The Internal Audit Unit reports functionally to the Board's Audit and Risk Committee and administratively to the Chief Executive Officer

Internal audit is a key pillar of good governance. It provides the board of directors, the audit and risk committee, the chief executive officer, senior executives and stakeholders with an independent view on whether the organisation has an appropriate risk and control environment, whilst also acting as a catalyst for a strong risk and compliance culture within an organisation.

Internal Audit plays a key and independent role within the organisation in assessing the adequacy and effectiveness of risk management, internal controls and governance processes. One of its functions is to ensure that there is improved internal control within the organisation as well as compliance with applicable legislation. Constant and regular monitoring of performance is undertaken.

The Internal Audit Unit prepares a risk-based Three-Year Coverage Plan as well as an Annual Audit Plan for approval by the Audit and Risk Committee. Progress reports against the plans are presented quarterly to the Audit and Risk Committee by the Internal Audit Manager, to enable it to discharge its oversight responsibility.

The Internal Audit Coverage Plan ensures that the internal audit function focuses on high and significant risk areas of the organisation. The plan is balanced, since it covers both strategic and operational risks, as well as issues of compliance.

3.3.4.2 Summary of audit work done

The Internal Audit Unit executed and completed all the audits on the approved Internal Audit Coverage Plan for the year under review and significant and major findings were reported to the Audit and Risk Committee on a quarterly basis. In addition, the Internal Audit Unit performed numerous ad-hoc audits requested by Management and the Audit and Risk Committee as part of its consulting activities.

3.3.4.3 Key activities and objectives of the Audit and Risk Committee

The Audit and Risk Committee derives its mandate from the Public Finance Management Act, 1999 (Act No. 1 of 1999) (PFMA) and the Treasury Regulations, with specific reference to section 51 of the PFMA.

The Audit and Risk Committee is independent and carries out its functions without any influence or interventions from the Board or Management. The committee operates in terms of a written Terms of Reference, and it satisfied its responsibilities for the year, in compliance with its terms of reference.

The committee reviewed all the internal audit reports and is satisfied:

- With the activities of the internal audit function, including its annual work programme, the reports of significant investigations and the responses of management to specific recommendations.
- That internal audit conducted its work in accordance with the standards set by the Institute of Internal Auditors.

Other than the findings raised by internal audit and addressed by management, nothing significant has come to the attention of the Audit and Risk Committee to indicate any material breakdown in the functioning of controls, procedures and systems

The committee is satisfied that it has discharged its responsibilities in assisting the accounting officer with the following activities:

- The safeguarding of assets, the operation of adequate systems, control and reporting processes, and the preparation of accurate reporting and financial statements in compliance with the applicable legal requirements and accounting standards.
- Overseeing the activities of, and ensuring coordination between, the activities of internal and external audit.
- Providing a forum for discussing enterprise-wide risks relating to financial, performance and regulatory exposures, and monitoring controls designed to minimise these risks.
- Reviewing the NMISA quarterly financial and performance information, annual report, including annual performance information and annual financial statements.

3.3.5 COMPLIANCE WITH LAWS AND REGULATIONS

Compliance with legislation and industry norms and standards is one of the many duties of the board.

For the function of legislative and regulatory compliance, NMISA has appointed a suitably qualified Manager: Compliance and Corporate Governance, to assist the board and management to ensure compliance with relevant legislation and statutes pertaining to their programmes. Compliance in relation to corporate and financial related compliance issues are the responsibility of the Chief Financial Officer. The Chief Executive Officer has overall, ultimate responsibility to monitor and ensure institutional and financial compliance. The Chairperson has executive authority, responsible for overall strategic and governance oversight.

NMISA, as a schedule 3A public entity, needs to comply with the provisions of the PFMA, the Measurement Act and the Companies Act and, in this regard, compliance is on par with similar public entities. Although compliance with the prescripts of the King Code on Corporate Governance is not legislated, it has become an industry accepted norm, and in this regard NMISA is compliant regarding those aspects of the code that are applicable to public and/or state-owned entities.

3.3.6 FRAUD AND CORRUPTION

The NMISA acknowledges the fact that the incidence of economic or commercial crime is an increasing phenomenon and has become an integral part of the current corporate and business environment. In this regard, the entity commits itself to –

- become one of those participants in the economy that will actively and proactively protect all of its assets against threats of crime like fraud, corruption, theft, bribery and others; and
- to pursue and bring to justice any perpetrator, whether inside or outside the NMISA, who commits any criminal activities against assets or interest of the organisation.

Apart from material financial implications, economic crimes have further detrimental effects on organisations, such as loss of reputation, the undermining of competitiveness and the erosion of credibility. NMISA subscribes to the national drive to eradicate fraudulent activities and has adopted a strategic approach to the management of economic crime prevention, detection and resolution by:

- unequivocally communicating to internal and external stakeholders its stance against, and its policy to prevent and deal with instances of economic crimes;
- practising and upholding good corporate governance;
- developing and instituting an ethical business environment that will cultivate an anti-crime culture within the entity;
- conducting regular assessments to identify risks;

- adopting a risk-based audit approach;
- strengthening internal controls;
- implementing proper fraud reporting and whistle-blowing structures; and
- developing a fraud response plan.

3.3.7 MINIMISING CONFLICT OF INTEREST

NMISA management maintains a register of all declarations of interest which is updated annually. This provides management with the opportunity to declare changes, or conflicts of interest, that affect the proceedings of all Board and Committee meetings. In addition to the director's personal interest, directors also disclose interests of their spouses, partners or close family members.

Full disclosure of the nature of a director's interest on any matter before the Board is required.

A director, as an individual, is disqualified, by his/her office in the NMISA, from contracting with the NMISA. However, any organisation he/she may represent is not, in like manner, disqualified.

3.3.8 CODE OF CONDUCT

NMISA is committed to a policy of fairness, transparency, honesty, impartiality, objectivity, credibility, integrity and, above all, accountability, in the conducting of all its business affairs, both inside and outside the organisation. This commitment is based on a fundamental belief in honest, fair and legal conduct in all business activities.

Employees are expected to share this commitment to high moral, ethical and legal standards. The purpose of this document is therefore to lay down a strict ethical code with which each employee, contract employee and consultant is required to comply.

Failure to comply with this Policy amounts to misconduct and is dealt with in terms of the NMISA's Disciplinary Code

3.3.9 HEALTH, SAFETY AND ENVIRONMENTAL ISSUES

NMISA's Total Quality Managment System (TQMS) is primarily based on the ISO/IEC 17025 standard, which is internationally acceptable for the competence of testing and calibration laboratories. Quality means satisfying the requirements, needs and expectations of all our customers and stakeholders. For this reason, NMISA has implemented additional components of the NMISA TQMS to enable compliance with other SHEQ standards, such as:

- ISO Guide 34, to demonstrate competence in producing various high quality certified reference materials,
- ISO/IEC 17043, to demonstrate competence to offer proficiency testing schemes,
- ISO 14001, to demonstrate to NMISA's clients and stakeholders commitment to support and promote environmental awareness and to work towards the protection of our planet and its precious resources,
- OHSAS 18001, to demonstrate commitment to and conformance with occupational, health and safety legislation, as well as ensuring a safe and healthy work environment for NMISA employees and interested parties.

To maintain NMISA laboratories' accreditation against ISO/IEC 17025 and ISO Guide 34, periodical surveillance assessments are conducted by the South Arican National Accreditation System (SANAS). For the laboratories where accreditiation is planned for a five year cycle, re-accreditation is required by conducting re-assessment supported by the participation of the international technical experts.

The table below outlines the surveillance assessments and re-assessments conducted during 2016/17:

NMISA LABORATORY	TYPE OF ASSESSMENT & TECHNICAL EXPERT/S USED	RECOMMENDATION
Time & Frequency	***Surveillance*** Derek Goldie- Private	Continued accreditation.
Dosimetry	***Personnel Evaluation and surveillance*** Germa Mare	Continued accreditation. Technical Signatory granted.
Fibre Optics	***Surveillance and personnel evaluations*** Derek Goldie- Private	Continued accreditation. Technical Signatory granted.
AUV	***Surveillance*** *National Institute of Metrology, Quality and Technology - INMETRO* *Rio de Janeiro, Brasil* Dr G Ripper	Continued accreditation
Humidity	***Re-assessment*** Dr Marti Heinonen – VTT Technical Research Centre, Finland Guy Snelling- Private	Renewal of accreditation.
Gas	***Surveillance*** Mr G Ravenscroft – Private	Continued accreditation
Temperature	***Re-assessment*** Mark Mathieson- Private	Renewal of accreditation
RF Electrical	***Re-assessment*** Dr Karsten Kuhlmann – Int TE- PTB	Renewal of accreditation

NMISA has voluntarily implemented and maintained the Health, Safety and Environmental Management System, which is certified against the requirements of ISO 14001 and OHSAS 18001. The South African Bureau of Standards (SABS) conducted stage one and two audits for the Cape Town site and stage two audits and re-certification for the Pretoria site in

the third quarter of the 2016/17 financial year, following the end of the three year cycle certification for only the Pretoria site in the second quarter.

3.3.10 COMPANY SECRETARY

NMISA has appointed a Company Secretary in line with the requirements of the Companies Act and the principles of good corporate governance as guided by the King Code.

The Company Secretary ensures that NMISA meets its compliance obligations for submission of documents to stakeholders including National Treasury and **the dti**.

The Company Secretary provides leadership for a centralised reporting function, and ensures that reports required by the Agency Management Unit of **the dti**, and National Treasury, are compiled and submitted on time. These reports include but are not limited to the strategic, annual performance plan, quarterly reports, monthly reports and ultimately the annual reports.

The Company Secretary serves as the direct channel of communication to Chairperson of the Board, as well as providing comprehensive practical support/guidance to the Board Chair and Committee Chairpersons in the proper compilation/timely circulation of board papers for the Board and its Committees. It is the responsibility of the Company Secretary to assess the training needs of board members and executive management regarding fiduciary/governance responsibilities.

The Company Secretary assists the Board in the evaluation process of board members and executive management.

3.3.11 SOCIAL RESPONSIBILITY

Cell C's Take a Girl Child to Work Day® is a respected movement that affords grade 10 to 12 girl learners the chance to experience a day in the workplace. NMISA was proud to host 17 female learners from Tshwane Secondary School during the 15th anniversary of Cell C's Take a Girl Child to Work Day® on May 25th, 2017. NMISA afforded the female learners opportunities to explore technical and support careers of which they might have had no knowledge, including CEO, Supply Chain Management, SHEQ, Human Resources, Legal, as well as Inorganic Analysis, Mass Metrology, Dosimetry, Gas Analysis, and Photometry. They were awarded certificates for successful participation in the initiative.

World Metrology Day is an annual celebration of the signing of the Metre Convention on 20 May 1875 by representatives of seventeen nations. NMISA celebrated World Metrology Day on May 19th, 2017 with the theme "measurements for transport". The Marketing and Communications team, together several technical staff members, visited Tshwane Secondary School in central Pretoria to educate learners about metrology and NMISA's impact on society, and to encourage high school learners to pursue careers in maths and science.

3.3.11.1 NMISA's "adopt a school" initiative

Through its partnership with the Greater Lebaka Education Enrichment Initiative (known as Kheale Centre) NMISA has sponsored bursaries for two students who completed their matric at two of the nine participating schools. One is pursuing an engineering degree while the other is studying towards a bachelor of science degree. The two students join other NMISA bursars annually for vacation work during university breaks to gain practical experience in their fields of study.

During a 2016 winter school, young professionals from various metrology units spent time with learners at Kheale Centre. In order to promote science, technology, engineering and mathematics the metrologists performed experiments and demonstrations with a metrology focus to present science to learners in a practical way and to encourage them to study mathematics and physical science. Interested learners were encouraged to apply for a NMISA bursary for further studies in science, engineering or technology at university. Through these initiatives NMISA is working towards a pipeline of excellent young staff members.

NMISA has adopted the Kheale Centre in Maphalle, Limpopo as part of our Human Capital Development and Social Responsibility programmes. Here Grade 12 learners are receiving an inspirational message about metrology from Ndwakhulu Mukhufhi, NMISA CEO. Ndwakhulu was himself a former student at the centre.

3.3.12 Audit Committee Report

We are pleased to present our report for the financial year ended 31 March 2017

The Audit and Risk Committee (ARC) is a sub-committee of the Board, appointed and accountable to the Board. It comprises of four (4) Board members and two (2) Independent members. The Chief Executive Officer, Chief Financial Officer, External Auditors and Internal Audit Manager are permanent invitees to the ARC meetings. The committee is pleased to announce that the NMISA has, once again, achieved an unqualified audit outcome with no material findings, this represents a fifth consecutive 'clean audit' outcome.

ROLES AND RESPONSIBILITY

The ARC hereby reports that it has complied with its responsibilities arising from Section 51 (1)(a)(ii) of the Public Finance Management Act and Treasury Regulation 27.1. The committee is regulated by approved Terms of Reference contained in the Committee's charter and has discharged these responsibilities. The Terms of Reference, including roles and responsibilities, were aligned with the requirements of the Public Finance Management Act (PFMA), Treasury Regulations and King III.

Key focus areas for the 2016/2017 financial year were as follows:

- Effectiveness of internal financial control systems
- Effectiveness of the internal audit function
- Risk management and monitoring of key strategic risk mitigation actions
- Adequacy, reliability and accuracy of financial information, accounting practices and non-financial information provided by management.
- Implementation of internal and external audit findings to improve the control environment
- NMISA's compliance with legal and regulatory provision.
- Independence and objectivity of both internal and external auditors as well as fostering synergies between the two functions
- Development of combined assurance framework and structure
- IT Governance and management

INTERNAL AUDIT AND EVALUATION OF CONTROL ENVIRONMENT

The ARC is responsible for the appointment, compensation, retention and oversight of the Internal Auditors. The Internal Auditors operate within the charter approved by the Board. Internal audit reports functionally to the ARC and operationally to the Accounting Officer.

The ARC has approved a risk-based three (3) year rolling internal audit plan in the 2016/17 financial year. The committee is reasonably satisfied with the effectiveness and independence of the Internal Audit function. The internal audit also reported on overall control environment and fraud hotline activities of the NMISA.

Internal audit completed all planned audits and provided appropriate remedial actions to management in order to enhance the control environment.

EXTERNAL AUDIT

The NMISA appointed NEXIA SAB&T as the new external auditors for a period 5 years. The ARC is satisfied with the independence and objectivity of the external auditors. We have reviewed and are satisfied with the unqualified audit opinion as expressed by external auditors in the relevant section of this annual report.

RISK MANAGEMENT

The Board has tasked the ARC to oversee governance, legislative and compliance requirements of enterprise risk management responsibilities of the Board. The Board is responsible for ensuring that there is adequate and timely identification and measurement of organisational risk as well as implementation of appropriate mitigation controls.

The Board held a risk identification workshop in the financial year under review where nine (9) strategic risks were identified. The new risk register has not been formally adopted by the Board however the identified risk are not significantly different from the existing risk register. The ARC will continue to monitor mitigation strategies proposed by Management.

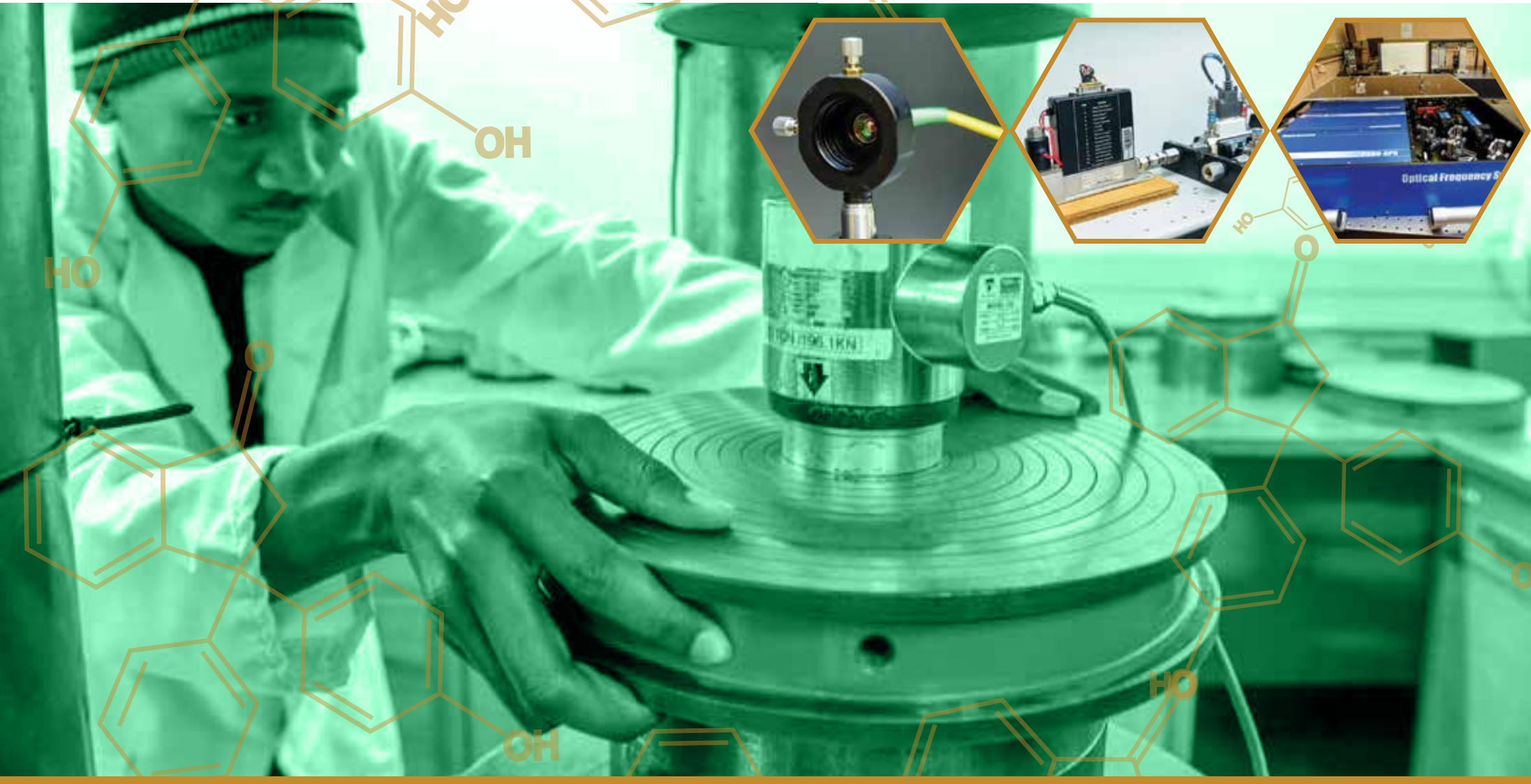
The ARC has closely monitored implementation of Business Continuity Plan and IT Governance framework. Whilst the ARC acknowledges some improvement in risk mitigation strategies, we are of the opinion that both these areas remained largely not fully mitigated.

EVALUATION OF ANNUAL FINANCIAL STATEMENTS

The ARC evaluated the Annual Financial Statements (AFS) of NMISA for the year ended 31 March 2017.

Based on the information provided by Management, Internal and External Audit, the committee considers that these statements comply, in all material respects, with the requirements of the PFMA, and the Generally Recognised Accounting Practice (GRAP) basis of preparation set out in note 1 of the Accounting policies in the AFS. The ARC concurs to the adoption of the going-concern assertion.

Tshidi Molala CA (SA)
Chairperson: Audit and Risk Committee



PART D

HUMAN RESOURCE MANAGEMENT

4.1 INTRODUCTION

NMISA 's human resources (HR) strategies are intended to ensure that the organisation 's objectives and plans are achieved. In the year under review NMISA embarked on a number of initiatives to provide a conducive environment to encourage higher performance. Management implemented a pay progression system for support roles which saw improvement in employees' salaries. The recapitalisation project necessitated a major investment towards training and development of employees. A target of 2% of personnel costs for training was far exceeded and the organisation spent over 5%. The newly acquired high tech instruments called for retraining of employees in their laboratories while others attended training overseas and at other National Metrology Institutes.

4.2 INVESTING IN NMISA'S PEOPLE

4.2.1 HUMAN CAPITAL DEVELOPMENT

Our Human Capital Development (HCD) program seeks to enable effective delivery of NMISA's strategic thrusts through recruiting, developing and empowering talent, thus positioning the institution as an employer of choice.

Some of the successes within our HCD program include two NMISA PhD students completing their degrees during the 2016/17 fiscal year within the Chemistry Section. One of the students specialised in the synthesis and characterisation of molecular imprinted membranes as applied in passive samplers for the analysis of persistent organic pollutants, and found a novel solution to analytically challenging ultra-trace analysis. The other specialised in developing analytical methods for organic pollutants in environmental matrices, which is a scarce skill in South Africa. Together they have presented more than 40 papers and posters at national and international conferences and have published seven scientific articles during their studies. These students are now both working at NMISA, in the Organic Analysis Section.

Another staff member earned his MSc in 2016. His MSc project focused on the determination of multiple mycotoxins in maize applying solid phase extraction and clean-up, liquid chromatography isotope dilution tandem mass spectrometry. This measurement method will be used to value assign the multi-mycotoxin maize reference material to be processed in the new African Food and Feed Reference Material facility. During his studies, the student delivered 5 poster and oral presentations. Further to that, this student has started his PhD in the NMISA Bioanalysis Section. The aim of this project is to analyse and characterise the cell surface membrane proteins expressed by Malaria infected cells to better understand the disease, to produce effective/targeted treatments to treat Malaria.

We are also proud to report that one staff member has completed a BSc Mechanical Engineering degree in 2016 and has started to work back in accordance with his bursary contract in the Mass and Force Section within the Physical Metrology Division.

4.2.2 INTEGRATED HCD AND QUALITY

As part of NMISA's drive to improve brand visibility and enhance awareness around the institutions service offerings, NMISA collaborated with Blue Wizard Productions to develop an episode on national television to provide insight into the career of a Gas Metrologist. Blue Wizard is a production company commissioned by SABC 1 to produce iSpani, a well-known career guidance programme which showcases different careers, and is now in its 8th season of production.

NMISA has taken an active interest in this opportunity as it also educates the youth of South Africa on career prospects and funding opportunities in the field of metrology. The 48-minute episode showcasing a day in the life of a Gas Metrologist, was aired on SABC 1 in the first quarter of 2017/18.

Another brand visibility integration was with Dräger, a company that supplies breathalysers, South African Breweries as well as SANAS through a "DRINK OR DRIVE" initiative that was launched in the December 2016 festive season. Four large billboards were placed on major highways in Gauteng, Western Cape, and KwaZulu-Natal.

The Mass Laboratory developed a video to create awareness of the role of mass measurements in everyday life. The video has been posted on YouTube for public access.

4.2.3 EMPLOYEE RELATIONS

Disciplinary cases increased significantly during the year resulting in termination of employment of two employees. Human Resources had embarked on a drive to make employees aware of the labour relations processes and procedures within NMISA, including awareness of the Code of Conduct/Ethics and training on chairing and initiating disciplinary hearings. Two Trade Unions, NEHAWU and Solidarity ran a membership recruitment drive, and although neither has been recognised as a majority union, the recruitment process is continuing.

4.2.4 Occupational Health

NMISA undertakes various tests related to occupational health, including Spirometry tests, eye screening tests and other biological tests for exposure to occupational hazards such as radiation.

NMISA targets zero fatalities and has suffered no incidents since its establishment in 2007. During the year under review, one employee was injured on duty and was booked off for an extended period while two were on extended sick leave due to ill health. In September 2016, NMISA held a Men's Health Day in an effort to assist men at NMISA to deal with their health problems. Later in the year, scores of men and women participated in health-related activities, which included screening; measuring blood pressure; glucose; cholesterol; weight; and body mass index (BMI), as well as HIV counselling and testing. HIV and AIDS education continues to be maintained by workshops and awareness campaigns run through the NMISA Employee Wellness Programme.

4.2.5 HUMAN RESOURCE OVERSIGHT STATISTICS

4.2.5.1 Personnel Cost by programme/activity/objective

DIRECTORATE/ BUSINESS UNIT	TOTAL EXPENDITURE FOR THE ENTITY (R'000)	PERSONNEL EXPENDITURE (R'000)	PERSONNEL EXP. AS A % OF TOTAL EXP. (R'000)	NUMBER OF EMPLOYEES	AVERAGE PERSONNEL COST PER EMPLOYEE (R'000)
Office of the CEO	11 542	7 852	68%	10	785
Chemistry and Materials Metrology	27 541	16 253	59%	30	542
Electricity and Magnetism	21 031	17 926	85%	29	618
Finance	66 136	12 228	18%	17	719
Corporate Services	9 598	7 108	74%	18	395
Ionising Radiation	9 079	7 897	87%	11	718
Physical Metrology	19 233	15 809	82%	27	586
Research, International and Infrastructure Development	11 907	6 378	54%	7	911
Total	**176 067**	**91 451**	**52%**	**149**	**614**

4.2.5.2 Personnel Costs by salary band

DIRECTORATE/ BUSINESS UNIT	PERSONNEL EXPENDITURE (R'000)	PERSONNEL EXP. AS A % OF TOTAL EXP. (R'000)	NUMBER OF EMPLOYEES	AVERAGE PERSONNEL COST PER EMPLOYEE (R'000)
Executive management	10 523	12%	8	1 315
Middle management	20 325	22%	22	924
Professional qualified	48 588	53%	86	565
Skilled	10 484	11%	27	388
Semi-skilled	1 531	2%	6	255
Total	**91 451**	**100%**	**149**	**3 447**

4.2.5.3 Performance Rewards

PROGRAMME/ ACTIVITY/ OBJECTIVE	PERFORMANCE REWARDS (R'000)	PERSONNEL EXPENDITURE (R'000)	% OF PERFORMANCE REWARDS TO TOTAL PERSONNEL COST (R'000)
Executive management	538	10 523	5%
Middle management	1 465	20 325	7%
Professional qualified	4 001	48 588	8%
Skilled	802	10 484	8%
Semi-skilled	141	1 531	9%
Total	**6 947**	**91 451**	**8%**

4.2.5.4 Training Costs

DIRECTORATE/ BUSINESS UNIT	PERSONNEL EXPENDITURE (R'000)	TRAINING EXPENDITURE (R'000)	TRAINING EXPENDITURE AS A % OF PERSONNEL COST (%)	NUMBER OF EMPLOYEES TRAINED	AVERAGE TRAINING COST PER EMPLOYEES
Office of the CEO	7 852	27	0,3%	10	3
Chemistry and Materials Metrology	16 253	587	3,6%	35	17
Electricity and Magnetism	17 926	337	1,9%	29	12
Finance	12228	2424	19,8%	20	121
Corporate Services	7 108	586	8,2%	20	29
Ionising Radiation	7 897	101	1,3%	12	8
Physical Metrology	15 809	1042	6,6%	31	34
Research, International and Infrastructure Development	6 378	310	4,9%	9	34
Total	**91 451**	**5 415**	**5,9%**	**166**	**33**

4.2.5.5 Employment and vacancies

DIRECTORATE/ BUSINESS UNIT	2015/16 NO. OF EMPLOYEES	2016/17 APPROVED POSTS	2016/17 NO. OF EMPLOYEES	2016/17 VACANCIES	FUNDED VACANCIES
Office of the CEO	10	12	10	2	1
Chemistry and Materials Metrology	26	40	30	10	3
Electricity and Magnetism	27	35	29	6	5
Finance	20	23	17	6	4
Corporate Services	13	23	18	5	1
Ionising Radiation	11	12	11	1	0
Physical Metrology	26	38	27	11	5
Research, International and Infrastructure Development	12	25	7	18	1
Total	**145**	**208**	**149**	**59**	**20**

4.2.5.3 Performance Rewards

SALARY BAND	EMPLOYMENT AT BEGINNING OF PERIOD	APPOINTMENTS	TERMINATIONS	EMPLOYMENT END OF THE PERIOD
Top management	7	1	0	8
Middle management	23	2	1	24
Professional qualified	71	14	6	85
Skilled	38	8	3	26
Semi-skilled	6	0	0	6
Total	**145**	**25**	**10**	**149**

4.2.5.7 Reasons for staff leaving

REASON	NUMBER	% OF TOTAL NUMBER OF STAFF LEAVING
Death	0	0%
Resignation	8	80%
Dismissal	2	20%
Retirement	0	0%
Ill health	0	0%
Expiry of contract	0	0%
Total	**10**	**100%**

4.2.5.8 Labour Relations: Misconduct and disciplinary action

NATURE OF DISCIPLINARY ACTION	NUMBER
Verbal Warning	0
Written warning	3
Final Written warning	0
Dismissal	2

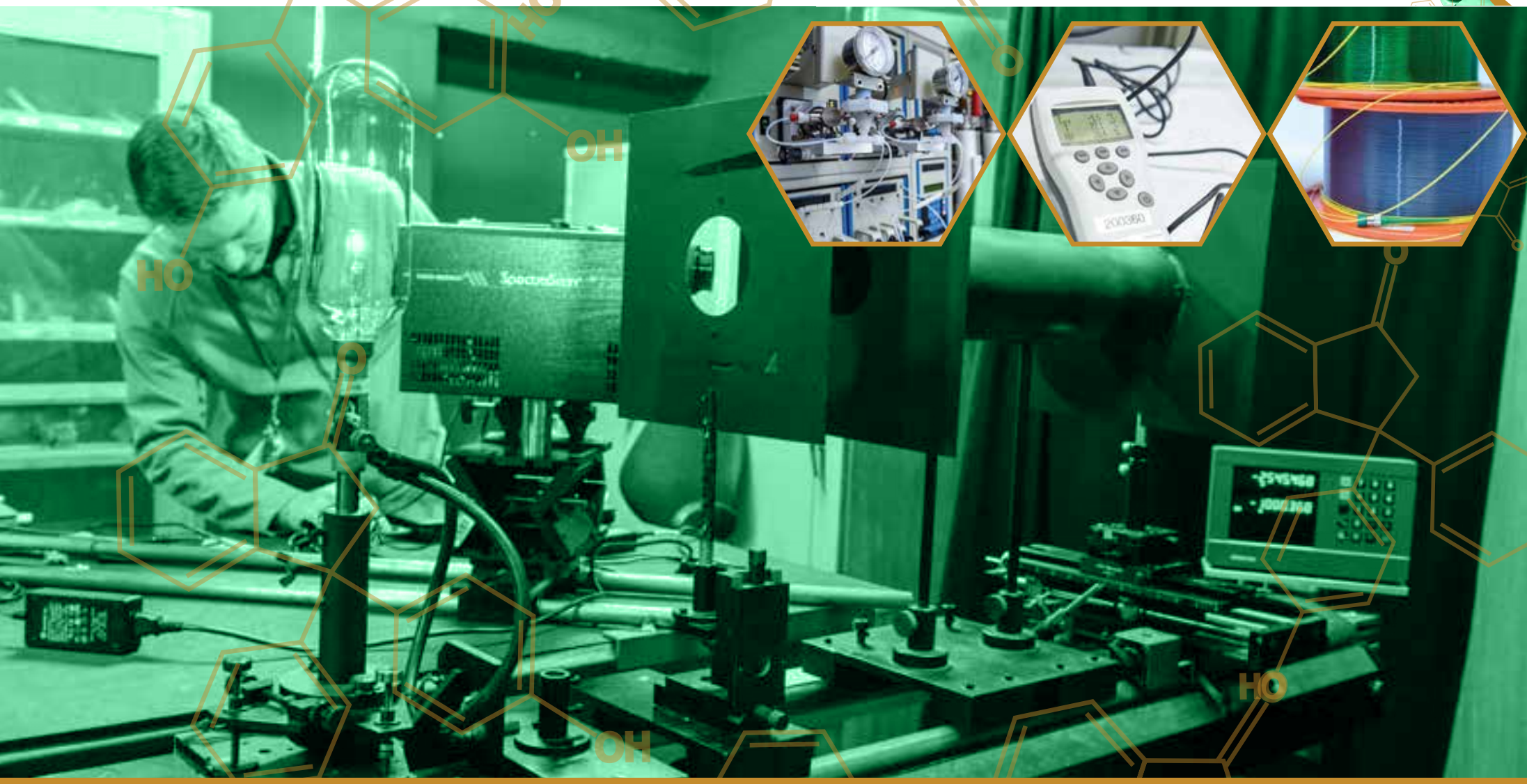
Ms Deirdre Claasen, research metrologist in the Organic Analysis section, analysing ethanol certified reference materials by headspace gas chromatography-flame ionization detection used for Forensic blood alcohol analysis traceability in support of law enforcement.

4.2.5.9 Equity target and employment equity status

LEVELS	MALE									
	AFRICAN		COLOURED		INDIAN		WHITE		FOREIGN NATIONALS	
	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET
Top management	2	2	0	0	0	0	2	2	0	0
Senior management	0	0	0	0	0	0	0	0	0	0
Professional qualified	37	33	3	2	4	2	20	21	4	4
Skilled	9	18	0	1	0	0	0	0	0	0
Semi-skilled	4	4	0	0	0	0	0	0	0	0
Unskilled	0	0	0	0	0	0	0	0	0	0
Total	**52**	**57**	**3**	**3**	**4**	**2**	**22**	**23**	**4**	**4**

LEVELS	FEMALE									
	AFRICAN		COLOURED		INDIAN		WHITE		FOREIGN NATIONALS	
	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET
Top management	2	2	0	0	0	0	2	2	0	0
Senior management	0	0	0	0	0	0	0	0	0	0
Professional qualified	20	25	0	1	0	1	20	19	1	1
Skilled	13	23	1	4	0	1	3	4	0	0
Semi-skilled	2	2	0	0	0	0	0	0	0	0
Unskilled	0	0	0	0	0	0	0	0	0	0
Total	37	52	1	5	0	2	25	25	1	1

LEVELS	DISABLED STAFF							
	AFRICAN		COLOURED		INDIAN		WHITE	
	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET	CURRENT	TARGET
Top management	0	0	0	0	0	0	0	0
Senior management	0	0	0	0	0	0	0	0
Professional qualified	0	1	0	0	0	0	1	0
Skilled	0	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0
Unskilled	0	0	0	0	0	0	0	0
Total	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**



PART E

AUDITED FINANCIAL INFORMATION

5.1 CFO'S REPORT

5.1.1 OVERVIEW

NMISA was established by the Measurement Units and Measurements Standards Act, No 18 of 2006, to provide for the use of measurement units of the International System of Units (SI) and certain other measurement units, to provide for the designation of national measurement units and standards, to provide for the keeping and maintenance of national measurement standards and units and to provide for the establishment and functions of the National Metrology Institute. To carry out this mandate it is funded by grant income received from the Department of Trade and Industry (**the dti**), the controlling entity. R264 million (2016: R251 million) allocation was received during the current year of which R163 million (2015: R155 million) was allocated towards capital expenditure whilst the balance was allocated to cover operating costs. As a NMI, NMISA has to ensure that the national measurement standards support international trade, health, environmental and safety requirements which necessitates the use of up to date equipment and a sound facility infrastructure. Since 2013/14 NMISA has been embarking on a recapitalising and modernisation project for the replacement of aged equipment and for funding of a feasibility study for a Private Public Partnership (PPP) project towards new laboratories and office space.

5.1.2 REVENUE

The Revenue to fund the organisation's expenditure is derived primarily from grant income; internally generated revenue from services rendered and interest income. The grant income from **the dti** of R264 million (2016: R251 million) comprises the majority of revenue at 90% (2016: 90%) of total revenue. Other revenue contributions include revenue from the rendering of services of R12million (2016: R12 million), interest received from invested funds of R16 million (2016: R14 million) and other income of R144 thousand (2016: R1, 5million). Revenue received against budget is depicted in the table below. The over achievement in interest received is as a result of efficient cash management practices whereby cash funds are invested in risk-freeshort-term bank deposits until commitments for goods and services are paid for.

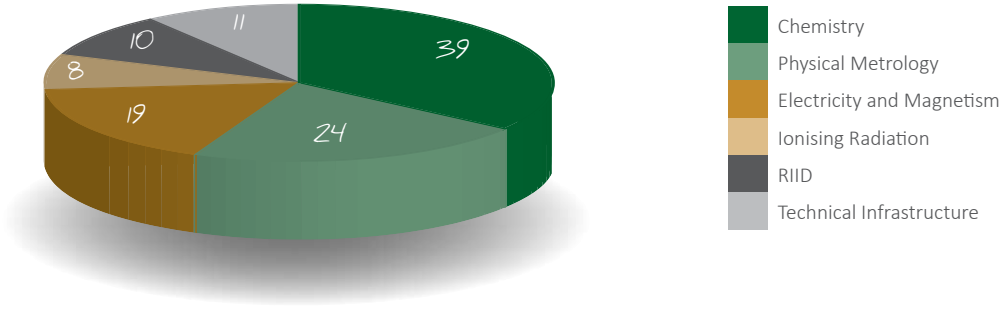
5.1.3 REVENUE FROM SERVICES RENDERED

As part of dissemination of the NMS to industry, NMISA's technical divisions offer a variety of measurement expertise and services to the South African public and private enterprises for which income is received. These services span from calibration and reference measurements to the sale of certified reference materials and training in measurement science. To supplement the anticipated decrease in grant funding from **the dti**, NMISA is continuously on a drive to bolster its internally generated revenue from services it could render with better plant and equipment. Actual revenue from services rendered was slightly below budget in the current year, but has been increasing from year to year.

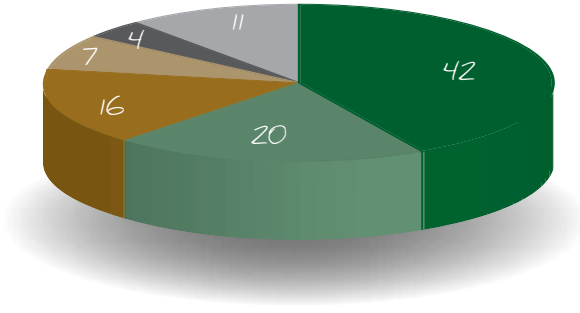
The Chemistry division contributed 39% (2016: 42%) to revenue from services rendered with their reference measurements and certification ofreference materials offerings, mainly driven by the increase in the certified reference material from the African Food and Feed Reference Material Programme (AFFRMP). This is followed by the provision of physical measurement parameter calibration through the Physical Metrology (PM) division contributing 24% (2016: 20%) to service revenue and the Electricity and Magnetism division in their provision of calibration services involving electricity and magnetism (EM) parameters contributing 19% (2016: 16%). The services in PM are mainly driven by the Manufacturing Competitiveness project while the major contributor to the EM revenue is the Green Economy project.

REVENUE SOURCES	2017			2016		
	BUDGET R'000	ACTUAL REVENUE RECEIVED R'000	VARIANCE R'000	BUDGET R'000	ACTUAL REVENUE RECEIVED R'000	VARIANCE R'000
Transfer from Controlling Entity	264 193	264 193	0%	250 895	250 895	0%
Rendering of Services	13 151	12 089	-8%	11 135	11 928	7%
Interest Received	12 500	15 833	27%	11 150	14 057	26%
Other Income	-	144	100%	-	1 517	100%
Total	**289 844**	**292 259**	**1%**	**273 180**	**278 397**	**2%**

2017 REVENUE FROM SERVICES RENDERED



2016 REVENUE FROM SERVICES RENDERED



Charts depicting service revenue received by division from South African public and private enterprises. These services span from calibration and reference measurements to the sale of certified reference materials and training in measurement science.

5.1.4 SPENDING TRENDS

The increase in total expenditure of the entity by 24% 2016:25%) is mainly attributed to overall growth of the organisation both in terms of human capital and equipment recapitalisation. As such, employee costs report a 28% (2016:23%) increase and depreciation and amortisation expense rising by 60% (2016:56%). The table below depicts expenditure performance against budget. Employee related costs account for just over half of total expenditure at NMISA, with 53% and 51% reported in the current and prior years, respectively. Employee related costs were slightly over budget with the operating and general costs account remaining within tight budgeted limits. Operating and general costs accounted for 38% (2016: 38%) of total expenditure whilst depreciation made up the balance of total expenditure.

5.1.5 COMMITMENTS

Over and above the expenditure reported, NMISA has commitments for which tenders have been awarded and purchase orders raised at year end. NMISA mainly procures equipment that is highly specialised, custom made or assembled to order according to specification, mostly from international manufacturers. The majority of delivery lead times for this equipment can be anything from 5 months to 12 months and beyond. For such awards and orders, funds are often rolled over from year to year, in the form of commitments. A total of R134 million (2016: R176 million) has been reported in this regard, comprising of R102 million (2016: R154 million) committed towards capital expenditure and R32 million (2016: R22 million) towards operating expenditure. To this extent, NMISA is exposed to foreign currency risk which is mitigated by some extent in requesting firm and fixed Rand prices from suppliers. These commitments are backed up with NMISA cash funds that are invested in short-term risk-free deposits until settlement is required.

EXPENDITURE	2017			2016		
	BUDGET R'000	ACTUAL EXPENDITURE R'000	VARIANCE R'000	BUDGET R'000	ACTUAL EXPENDITURE R'000	VARIANCE R'000
Operating and General Expenses	70 992	58 588	21%	51 933	54 173	-4%
Depreciation and Amortisation	-	23 765	-100%	-	14 841	-100%
Employee Related Cost	90 228	92 904	-3%	79 701	72 336	10%
Total Expenditure	**161 220**	**175 257**	**-9%**	**131 634**	**141 350**	**-7%**

5.1.6 SURPLUS

NMISA reported a surplus of R116 million (2016:R137 million) for the year which contributed to an accumulated surplus at year end of R537 million (2016: R421 million). This surplus is mainly as a result of the unpaid commitments. In this regard, a request for retention of the cash surplus will be sent to the National Treasury in line with section 53(3) of the Public Finance Management Act (PFMA).

5.1.7 WORKING CAPITAL

The institute has a healthy working capital balance and is able to meet its ongoing financial obligations. Available working capital is managed effectively and efficiently to ensure that the NMISA always remains liquid and solvent. Cash funds held are rather high at R199 million (2016: R230 million). This, however, follows the reported commitments for which delivery of orders and awards have not been made. Trade receivables of R3,0 million (2016: R2,5 million) represent 25% (2016: 21%) of total revenue from services rendered predominantly to private sector clientele. Only 2% (2016: 3%) of these have been identified as impaired. Payables from exchange transactions amount to R19,2 million (2016: R12,4 million). NMISA strives to adhere to Treasury regulations of settling its creditors within 30 days; hence 97% (2016: 97%) is held in the current payable ageing list. Inventory comprising of raw materials and finished goods used in the production of certified reference material amounted to R369 thousand (2016: R273 thousand) at the end of the year and is expected to increase with the forecasted expansion of the African Food and Feed Reference Material Programme (AFFRMP).

5.1.8 CAPITAL INVESTMENTS

NMISA's capital investment is represented by property, plant and equipment (PPE) and IT software, carried at R342 million (2016: R190 million) and R3 million (2016: R2 million) respectively. This constitutes 62% (2016: 44%) of total assets. Additions of R176 million (2016: R102 million was incurred on PPE and R2,3 million (2016: R1,7 million) was added to computer software. With the continuing recapitalization of the aged infrastructure, this balance is expected to continue to rise. When taking capital commitments of R94 million (2016: R154 million) into consideration, total CAPEX spend could increase to R439 million (2016: R345 million) and thus may command as much as 67% (2016: 59%) of total assets in the near future. Assets are managed through an asset management policy that stipulates procedures for ensuring that processes are applied uniformly throughout the entity as prescribed by the PFMA and National Treasury regulations and the requirements of GRAP and the National Treasury prescribed regulations. NMISA maintains an up-to-date fixed asset register with the support of a full time asset management section that also monitors the existence and condition of assets. Acquisitions are made in line with the approved annual procurement plan, which is managed in line with Treasury's SCM Instruction 2 of 2016/17 on Procurement plans- submission and reporting. Disposing of all written-off equipment is authorised by the Board. All assets are depreciated based on their estimated useful lives. Useful life assessments are performed annually and all assets carried in the asset register are of good or fair condition.

5.1.9 FINANCIAL OUTLOOK

NMISA will continue to obtain funding from **the dti** budget allocation. R254 million is budgeted for the 2017/18 financial year of which R146 million is allocated towards capital expenditure for the continued investment in infrastructure and replacement of aged equipment. To address the decline in grant funding from **the dti**, Management is pursuing initiatives to increase its revenue from internally generated services and funding from public-private-partnerships. NMISA still awaits Treasury's second approval of the PPP project for the construction of its own laboratories, office space and equipment to fulfill its current and long-term needs and to ensure that it continues to be recognised as a sustainable, respected and internationally recognised metrology institute, providing reliable measurement standards and solutions.

Mr Ziyaad Adam CA (SA)
Chief Financial Officer
31 July 2017

5.2 INDEPENDENT AUDITOR'S REPORT

INDEPENDENT AUDITOR'S REPORT TO PARLIAMENT ON THE NATIONAL METROLOGY INSTITUTE OF SOUTH AFRICA

REPORT ON THE AUDIT OF FINANCIAL STATEMENTS

Opinion

We have audited the financial statements of the National Metrology Institute of South Africa set out on pages 54 to 87, which comprise the statement of financial position as at 31 March 2017, and the statement of financial performance, statement of changes in net assets, statement of cash flows and the 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.

In our opinion, the financial statements present fairly, in all material respects, the financial position of the National Metrology Institute of South Africa as at 31 March 2017, 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 (PFMA).

Basis for opinion

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

We are independent of the entity in accordance with the Independent Regulatory Board for Auditors' Code of professional conduct for 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 IRBA code and in accordance with 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).

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

The Board, which constitutes the accounting authority, is responsible for the preparation and fair presentation of the financial statements in accordance with the South African Standards of Generally Recognised Accounting Practice (GRAP) and the requirements of the Public Finance Management Act of South Africa, 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.

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 entity or to cease operations, or has no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

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 the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

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

REPORT ON THE AUDIT OF THE ANNUAL PERFORMANCE REPORT

Introduction and scope

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 selected objectives presented in the annual performance report. We performed procedures to identify findings but not to gather evidence to express assurance.

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 established and included in the planning documents. Our procedures also did not extend to any disclosures or assertions relating to planned performance strategies and information relating to future periods that may be included as part of the reported performance information. Accordingly, our findings do not extend to these matters.

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 objectives presented in the annual performance report of the National Metrology Institute of South Africa for the year ended 31 March 2017.

OBJECTIVES	PAGES IN ANNUAL REPORT
Strategic Objective 1: Provide the national measurement units by maintaining the SI units, units outside the SI and equivalent units	29
Strategic Objective 2: Maintain the Schedule of National Measurement Standards	29
Strategic Objective 3: Improved and new national measurement standards, secondary standards, reference materials and methods	30
Strategic Objective 4: To ensure internationally recognised and comparable national measurement standards and units by participating in the Metre Convention, CIPM MRA and AFRIMETS activities	30
Strategic Objective 5: Establish confidence in the accuracy of the national measurement standards by suitable and documented quality and management system	30
Strategic Objective 6: To maintain the calibration and measurement capability (CMC) claims in KCDB as evidence of South Africa's measurement capability	30
Strategic Objective 7: Recapitalise and modernise the NMISA to ensure that the national measurement standards support international trade, health, environmental and safety requirements	30
Strategic Objective 8: As the foundation of the South African measurement system, provide technical measurement expertise and support for public policy objectives, accreditation, standardisation and regulatory affairs	31
Strategic Objective 9: To maintain and ensure continued expertise and establish the necessary skills according to internationally acceptable standards	31
Strategic Objective 10: Disseminate traceability, measurement expertise and services to South African public and private enterprises by means of calibration, measurement or analysis, certified reference materials	31
Strategic Objective 11: Provide appropriate technology and skills transfer to the South African industry, especially to SMEs	32
Strategic Objective 12: Comply with government directives, the PFMA, treasury regulations and regulatory issues in terms of health, safety and the environment and apply good governance.	32

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.

The material findings in respect of the usefulness and reliability of the selected objectives are as follows:

Adjustments of material misstatements

We identified material misstatements in the annual performance report submitted for auditing. These material misstatements were on the reported performance information of the following programmes selected for auditing:

- Strategic Objective 1: Provide the national measurement units by maintaining the SI units, units outside the SI and equivalent units
- Strategic Objective 9: To maintain and ensure continued expertise and establish the necessary skills according to internationally acceptable standards

As management subsequently corrected all of the misstatements identified, therefore we do not report any material findings on the usefulness and reliability of the reported performance information for the selected objectives.

REPORT ON THE AUDIT OF COMPLIANCE WITH LEGISLATION

Introduction and scope

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.

The material findings in respect of the compliance criteria for the applicable subject matters are as follows:

Annual financial statements

The financial statements submitted for auditing were not prepared in accordance with the prescribed financial reporting framework and supported by full and proper records as required by section 55(1)(a) and (b) of the Public Finance Management Act. Material misstatements relating to commitments as well as inadequate disclosure of Provisions, identified by the auditors in the submitted financial statements were subsequently corrected, resulting in the annual financial statements receiving an unqualified audit opinion.

OTHER INFORMATION

The National Metrology Institute of South Africa's accounting authority is responsible for the other information. The other information comprises the information included in the annual report which includes the reports by the accounting authority and the audit committee's report. The other information does not include the financial statements,

the auditor's report thereon and those selected objectives presented in the annual performance report that have been specifically reported on in the auditor's report.

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.

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 objectives presented in the annual performance report, or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed, on the other information obtained prior to the date of this auditor's report, we conclude that there is a material misstatement of this other information, we are required to report that fact.

INTERNAL CONTROL DEFICIENCIES

We considered internal control relevant to our audit of the financial statements, annual performance report and compliance with legislation, however the objective is not to express any form of assurance thereon. The matters reported below are limited to the significant deficiencies that resulted in the findings on the report on the performance report and the findings on compliance with legislation included in this report.

Financial and performance management

Management did not ensure that daily and monthly controls put in place are executed; monitored and reviewed to ensure financial and non-financial information reported is accurate, valid and complete.

Management did not adequately review the annual financial statements and the annual performance report against compliance with the relevant reporting framework before submitting them for auditing. Material matters were noted that required correction.

AUDIT TENURE

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 National Metrology Institute of South Africa for one year.

Nexia SAB& T
Per: Ndumi Medupe Director
Registered Auditor
25 July 2017

ANNEXURE A - 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 objectives 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 the 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 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 Accounting Standards Board'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 us at the date of the auditor's report. However, future events or conditions may cause an entity to cease to continue 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.

ANNEXURE B – AUDITOR'S RESPONSIBILITY FOR THE AUDIT OF THE REPORTED PERFORMANCE INFORMATION

As part of an audit in accordance with ISAE 3000, we exercise professional judgement and maintain professional scepticism throughout our reasonable assurance engagement on reported performance information for selected objectives.

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

Quality control relating to assurance engagements

In accordance with International Standard on Quality Control 1, we maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements and professional standards.

Reported performance information

In addition to our responsibility for the assurance engagement on reported performance information as described in the auditor's report, we also:

- identify and assess risks of material misstatement of the reported performance information, 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. In making those risk assessments we consider internal control relevant to the management and reporting of performance information per selected objective 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 documentation maintained by the entity that supports the generation, collation, aggregation, monitoring and reporting of performance indicators and their related targets for the selected objectives.
- evaluate and test the usefulness of planned and reported performance information, including presentation in the annual performance report, its consistency with the approved performance planning documents of the entity and whether indicators and related targets were measurable and relevant.
- Evaluate and test the reliability of information on performance achievement to determine whether it is valid, accurate and complete.

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.

5.3 STATEMENT OF FINANCIAL POSITION

AS AT 31 MARCH 2017

	NOTE(S)	2017 R	2016 R
Assets			
Current Assets		**213 746 606**	**243 839 506**
Receivables from exchange transactions	6	3 046 340	2 454 334
Inventories	7	369 404	272 539
Prepayments	27	11 612 047	11 209 049
Cash and cash equivalents	8	198 718 815	229 903 584
Non-Current Assets		**347 363 257**	**192 364 449**
Property, plant and equipment	3	341 943 565	189 516 661
Intangible assets	4	3 174 227	2 181 995
Prepayments	27	1 640 046	60 374
Rental deposit	23	605 419	605 419
Total Assets		**561 109 863**	**436 203 955**
Net Assets and Liabilities			
Net Assets			
Accumulated surplus		537 211 793	421 020 895
Current Liabilities			
Payables from exchange transactions	9	19 174 634	12 448 891
Provisions	28	3 564 570	2 154 504
Income received in advance	5	1 158 866	579 665
Total Liabilities		**23 898 070**	**15 183 060**
Total Net Assets and Liabilities		**561 109 863**	**436 203 955**

5.4 STATEMENT OF FINANCIAL PERFORMANCE

FOR THE YEAR ENDED 31 MARCH 2017

	NOTE(S)	2017 R	2016 R
Revenue		**292 259 005**	**278 396 709**
Revenue from exchange transactions		**28 066 055**	**27 501 709**
Rendering of services		12 088 925	11 927 947
Other income		143 854	1 516 979
Interest received		15 833 226	14 056 783
Revenue from non-exchange transactions		**264 193 000**	**250 895 000**
Transfer from controlling entity	10	264 193 000	250 895 000
Expenditure		**(175 257 432)**	**(141 349 881)**
Employee related expenses	12	(92 903 527)	(72 335 980)
Depreciation and amortisation	3&4	(23 764 699)	(14 841 261)
Impairment loss	3	(1 036 150)	(1 234 969)
Credit losses (written off)/reversed	13	(36 250)	48 359
Repairs and maintenance	3	(4 468 840)	(3 203 239)
Contracted services		(119 760)	(108 089)
Operating expenses	11	(52 928 206)	(49 674 702)
		(810 675)	**102 388**
(Deficit)/ profit on disposal of assets		(181 031)	234 876
Foreign exchange loss		(629 644)	(132 488)
Surplus for the year		**116 190 898**	**137 149 216**

5.5 STATEMENT OF CHANGES IN NET ASSETS

FOR THE YEAR ENDED 31 MARCH 2017

	ACCUMULATED SURPLUS R
Balance as at 31 March 2015	**283 871 679**
Changes in net assets	
Surplus for the year	137 149 216
Balance as at 31 March 2016	**421 020 895**
Changes in net assets	
Surplus for the year	116 190 898
Balance as at 31 March 2017	**537 211 793**

5.6 CASH FLOW STATEMENT

FOR THE YEAR ENDED 31 MARCH 2017

	NOTE(S)	2017 R	2016 R
Cash flows from operating activities			
Receipts		**292 122 003**	**277 239 589**
Rendering of services		11 951 923	12 287 806
Transfer from controlling entity		264 193 000	250 895 000
Interest received		15 833 226	14 056 783
Other income		143 854	-
Payments		**(144 905 758)**	**(135 532 218)**
Employee related costs		(91 526 629)	(72 535 146)
Suppliers		(53 379 129)	(62 997 072)
Net cash flows from operating activities	14	**147 216 245**	**141 707 371**
Cash flows from investing activities			
Purchase of property, plant and equipment	3	(176 130 811)	(100 935 031)
Purchase of intangible assets	4	(2 331 479)	(1 659 318)
Proceeds from sale of property, plant and equipment		61 276	241 317
Net cash flows from investing activities		**(178 401 014)**	**(102 353 032)**
Net (decrease)/increase in cash and cash equivalents		**(31 184 769)**	**39 354 339**
Cash and cash equivalents at the beginning of the year		229 903 584	190 549 245
Cash and cash equivalents at the end of the year	8	**198 718 815**	**229 903 584**

5.7 STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS

FOR THE YEAR ENDED 31 MARCH 2017

	Approved Budget R	Adjustments R	Final Budget R	Actual R	Variance R	% Variance %	NOTES
Revenue	**289 844 000**	**-**	**289 844 000**	**292 259 005**	**(2 415 005)**	(1%)	
Revenue from exchange transactions	**25 651 000**	**-**	**25 651 000**	**28 066 005**	**(2 415 005)**	(9%)	
Rendering of services	13 151 000	-	13 151 000	12 088 925	1 062 075	8%	26.1
Interest received	12 500 000	-	12 500 000	15 833 226	(3 333 226)	(27%)	26.2
Other income	-	-	-	143 854	(143 854)		26.7
Revenue from non-exchange transactions	**264 193 000**	**-**	**264 193 000**	**264 193 000**	**-**		
Transfer from controlling entity	264 193 000	-	264 193 000	264 193 000	-		
Expenditure	**(161 963 000)**	**743 000**	**(161 220 000)**	**(176 068 107)**	**14 848 107**	9%	
Employee related expenses	(89 767 770)	(460 000)	(90 227 770)	(92 903 527)	2 675 757	3%	26.3
Depreciation and amortization	-	-	-	(23 764 699)	23 764 699		26.7
Impairment loss	-	-	-	(1 036 150)	1 036 150		26.7
Credit losses on receivables	-	-	-	(36 250)	36 250		26.7
Repairs and maintenance	(11 796 750)	2 517 000	(9 279 750)	(4 468 840)	(4 810 910)	(52%)	26.4
Contracted services	(150 000)	-	(150 000)	(119 760)	(30 240)	(20%)	26.5
Foreign exchange loss	(350 000)	200 000	(150 000)	(629 644)	479 644	320%	26.8
Loss on disposal of assets	-	-	-	(181 031)	181 031		26.7
Operating expenses	(59 898 480)	(1 514 000)	(61 412 480)	(52 928 206)	(8 484 274)	(14%)	26.5
Capital expenditure	-127 881 000	(743 000)	(128 624 000)	(178 462 290)	49 838 290	39%	26.6
Surplus/(deficit) for the year	**-**	**-**	**-**	**(62 271 392)**	**62 271 392**		
RECONCILIATION							
Format and classification differences							
Cash flows from investing activities	**-**	**-**	**-**	**178 462 290**	**-**		
Property, plant and equipment	-	-	-	176 130 811	-		
Intangible assets	-	-	-	2 331 479	-		
Surplus in the Statement of Financial Performance	**-**	**-**	**-**	**116 190 898**	**-**		

5.8 ACCOUNTING POLICIES

1. BASIS OF PREPARATION

The annual financial statements were prepared in accordance with the Standards of Generally Recognised Accounting Practice (GRAP), including any interpretations, guidelines and directives issued by the Accounting Standards Board in accordance with Section 55 (1) (b) of the Public Finance Management Act, No. 1 of 1999 (PFMA), as amended.

These annual financial statements were prepared on an accrual basis of accounting and are in accordance with historical cost convention unless specified otherwise. They are presented in South African Rand, which is NMISA's functional currency. Amounts in the financial statements are rounded to the nearest Rand.

The financial statements were prepared on the assumption that the entity is a going concern and will continue to be in operation for the foreseeable future.

A summary of the significant accounting policies, which are consistent with the prior year, are disclosed below.

1.1 PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are tangible non-current assets (including infrastructure assets) that are held for use in the production or supply of goods or services, rental to others, or for administrative purposes, and are expected to be used during more than one reporting period. This excludes investment property.

The cost of an item of property, plant and equipment is the purchase price and other costs attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Trade discounts and rebates are deducted in arriving at the cost.

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 or fair value of the item can be measured reliably.

Property, plant and equipment are initially measured at cost.

Where an asset is acquired at no cost or at a nominal cost, its cost is its fair value as at the date of acquisition.

Property, plant and equipment is carried at cost less accumulated depreciation and any accumulated impairment losses.

Property, plant and equipment are depreciated on the straight line basis over their expected useful lives to their estimated residual value.

The useful lives of items of property, plant and equipment were assessed as follows:

ITEM	USEFUL LIFE IN YEARS
Plant and equipment	5 to 30
Furniture and fixtures	2 to 10
Motor vehicles	5 to 10
Office equipment	3 to 30
Leasehold improvements	< Lease period/useful life

The cost of leasehold improvements is depreciated over the shorter of the lease period or the useful life.

The residual value, the useful life and depreciation method of each asset are reviewed at the end of each reporting date. If the expectations differ from previous estimates, the change is accounted for as a change in accounting estimate.

Reviewing the useful life of an asset on an annual basis does not require the entity to amend the previous estimate unless expectations differ from the previous estimate.

Each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

Parts of some items of property, plant and equipment may require replacement at regular intervals, the cost of replacing parts of such an item is capitalised if the recognition criteria are met. The carrying amount of those parts that are replaced is derecognised in accordance with the derecognition provisions.

The depreciation charge for each period is recognised in surplus or deficit unless it is included in the carrying amount of another asset.

Items of property, plant and equipment are derecognised when the asset is disposed of or when there are no further economic benefits or service potential expected from the use of the asset.

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.

The entity separately discloses expenditure to repair and maintain property, plant and equipment in the notes to the financial statements (see note 3).

1.2 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 or fair value of the asset can be measured reliably.

Intangible assets are initially recognised at cost. The cost of intangible assets is the purchase price and other costs attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Trade discounts and rebates are deducted in arriving at the cost.

After initial recognition an intangible asset is carried at its cost less any accumulated amortisation and any accumulated impairment losses.

The amortisation period and the amortisation method for intangible assets are reviewed at each reporting date.

Internally generated brands, mastheads, publishing titles, customer lists and items similar in substance are not recognised as intangible assets.

Amortisation is provided to write down the intangible assets, on a straight line basis, to their residual values as follows:

ITEM	USEFUL LIFE IN YEARS
Software	2

Items of intangible assets are derecognised when the intangible asset is disposed of or when there are no further economic benefits or service potential expected from the use of the intangible asset.

The gain or loss arising from derecognition of an item of intangible asset is included in surplus or deficit when the item is derecognised. The gain or loss arising from derecognition of an item of intangible asset is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

1.3 FINANCIAL INSTRUMENTS

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or a residual interest of another entity.

Initial measurement of financial assets and financial liabilities

The entity measures a financial asset and financial liability initially at its fair value, plus transaction costs that are directly attributable to the acquisition or issue of the financial asset or financial liability.

Subsequent measurement of financial assets and financial liabilities

Financial assets and liabilities are measured at amortised cost after initial recognition.

1.4 FINANCIAL ASSETS

NMISA's principal financial assets are trade and other receivables and cash and cash equivalents.

Trade and other receivables

Trade and other receivables are classified as financial assets at amortised cost. A provision for impairment of trade 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.

Cash and cash equivalents

Cash and cash equivalents comprise cash on hand and deposits held on call with banks and are classified as financial assets at amortised cost.

Impairment and uncollectability

The entity assesses at the end of each reporting period, whether there is any objective evidence that a financial asset or group of financial assets is impaired.

A financial asset or a group of financial assets is impaired and impairment losses are incurred if, and only if, there is objective evidence of impairment as a result of one or more events that occurred after the initial recognition of the asset (a loss event) and that loss event (or events) has an impact on the estimated future cash flow of the financial asset or group of financial assets that can be reliably estimated.

It may not be possible to identify a single, discrete event that caused the impairment, since it may have been the combined effect of several events that did so. Losses expected as a result of future events, no matter how likely, are not recognised. The entity first assesses whether objective evidence of impairment exists individually for financial assets that are individually significant, and then follows a portfolio approach with the remaining financial assets.

The impairment loss estimates equal the best estimates within a range of long outstanding assets with similar credit risk characteristics.

If there is objective evidence that an impairment loss on financial assets, measured at amortised cost, was incurred, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flow (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate. The carrying amount of the asset is reduced directly through the use of an allowance account. The amount of the loss is recognised in surplus or deficit.

If, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed directly or by adjusting an allowance account. The reversal does not result in a carrying amount of the financial asset that exceeds what the amortised cost would have been had the impairment not been recognised at the date the impairment is reversed. The amount of the reversal is recognised in surplus or deficit.

Derecognition

The entity derecognises a financial asset when:

- the contractual rights to the cash flow from the financial asset expire, are settled or waived;
- the entity transfers to another party substantially all of the risks and rewards of ownership of the financial assets; or
- the entity, despite having retained some significant risks and rewards of ownership of the financial asset, has transferred control of the asset to another party and the other party has the practical ability to sell the asset in its entirety to an unrelated third party and is able to exercise that ability unilaterally and without needing to impose additional restrictions on the transfer.

1.5 FINANCIAL LIABILITIES

NMISA's principal financial liabilities are trade and other payables.

Trade and other payables

Trade and other payables are classified as financial liabilities at amortised cost.

Derecognition

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

1.6 LEASES

A lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership. A lease is classified as an operating lease if it does not transfer substantially all the risks and rewards incidental to ownership.

When a lease includes land and buildings elements, the entity assesses the classification of each element separately.

Operating leases – lessee

Operating lease payments are recognised as an expense on a straight-line basis over the lease term. The difference between the amounts recognised as an expense and the contractual payments are recognised as an operating lease asset or liability.

1.7 INVENTORIES

Inventories are initially measured at cost except where inventories are acquired through a non-exchange transaction, and then their costs are their fair value as at the date of acquisition.

Subsequently inventories are measured at the lower of cost and net realisable value.

Inventories are measured at the lower of cost and current replacement cost where they are held for;

- distribution at no charge or for a nominal charge; or
- consumption in the production process of goods to be distributed at no charge or for a nominal charge.

Net realisable value is the estimated selling price in the ordinary course of operations less the estimated costs of completion and the estimated costs necessary to make the sale, exchange or distribution.

Current replacement cost is the cost the entity incurs to acquire the asset on the reporting date.

The cost of inventories is assigned using the weighted average cost formula. The same cost formula is used for all inventories having a similar nature and use to the entity.

When inventories are sold, the carrying amounts of those inventories are recognised as an expense in the period in which the related revenue is recognised. If there is no related revenue, the expenses are recognised when the goods are distributed, or related services are rendered. The amount of any write-down of inventories to net realisable value or current replacement cost and all losses of inventories are recognised as an expense in the period the write-down or loss occurs.

The amount of any reversal of any write-down of inventories, arising from an increase in net realisable value or current replacement cost, are recognised as a reduction in the amount of inventories recognised as an expense in the period in which the reversal occurs.

1.8 PROVISIONS AND CONTINGENCIES

Provisions

A provision is recognised when:

- the entity has a present obligation (legal or constructive) as a result of a past event;
- 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 of the amount of the obligation.

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.

Where the effect of the time value of money is material, the amount of a provision shall be the present value of the expenditure expected to be required to settle the present obligation. The discount rate shall reflect current market assessments of the time value of money and risks specific to the liability.

The entity reviews provisions at each reporting date, and adjusts them if necessary, to reflect the current best estimate.

Provisions are reversed if it is no longer probable that an outflow of resources, embodying economic benefits or service potential, will be required to settle the obligation. Where discounting is used, the carrying amount of a provision increases in each period to reflect the passage of time. This increase is recognised as an interest expense.

Contingent liabilities

Contingent liabilities are recorded in the notes to the financial statements when there is a possible obligation that arises from past events, and whose existence will be confirmed only by the occurrence or non-occurrence of one or more uncertain future events not within the control of NMISA or when there is a present obligation that is not recognised because it is not probable that an outflow of resources will be required to settle the obligation, or the amount of the obligation cannot be measured reliably.

1.9 COMMITMENTS

Commitments are recorded at cost in the notes to the financial statements when there is a contractual arrangement or an approval by management in a manner that raises a valid expectation that NMISA will discharge its responsibilities thereby incurring future expenditure that will result in the outflow of cash.

1.10 REVENUE FROM EXCHANGE TRANSACTIONS

An exchange transaction is one in which an entity receives assets or services or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of goods, services or use of assets) to the other party in exchange.

Rendering of services

When the outcome of a transaction involving the rendering of services can be estimated reliably, revenue associated with the transaction is recognised by reference to the stage of completion of the transaction at the reporting date. The outcome of a transaction can be estimated reliably when all the following conditions are satisfied:

- The amount of revenue can be measured reliably;
- It is probable that the economic benefits associated with the transaction will flow to NMISA;
- The stage of completion of the transaction at the reporting date can be measured reliably; and
- The costs incurred for the transaction and the costs to complete the transaction can be measured reliably.

Revenue is measured at the fair value of the consideration received or receivable.

Interest

Interest is recognised, in surplus or deficit, using the effective interest rate method.

1.11 REVENUE FROM NON-EXCHANGE TRANSACTIONS

Non-exchange transactions are transactions that are not exchange transactions. In a non-exchange transaction, an entity either receives value from another entity without directly giving approximately equal value in exchange, or gives value to another entity without directly receiving approximately equal value in exchange.

Revenue from a non-exchange transaction is measured at the amount of the increase in net assets recognised by the entity. NMISA receives an unconditional grant via the Department of Trade and Industry (**the dti**).

1.12 FOREIGN CURRENCY TRANSLATION

A foreign currency transaction is recorded, on initial recognition in the functional currency, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction.

At each reporting date:

- foreign currency monetary items are translated using the closing rate; and
- Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction.

1.13 CHANGES IN ESTIMATES

Estimates involve judgement based on recently available, reliable information and therefore an estimate may change as new information becomes known, circumstances change or more experience is obtained.

The entity recognises the effects of changes in accounting estimates prospectively, by including the effects in surplus or deficit in the period of the change if the change affects that period only or in the period of the change and future periods, if the change affects both.

1.14 FRUITLESS AND WASTEFUL EXPENDITURE

Fruitless and wasteful expenditure as defined by Section 1 of the PFMA means expenditure which was made in vain and would have been avoided had reasonable care been exercised.

Fruitless and wasteful expenditure is recorded in the notes to the financial statements when confirmed. The amount recorded is equal to the total value of the fruitless and wasteful expenditure incurred. The expenditure is removed from the notes to the financial statements when it is resolved or transferred to receivables for recovery.

Fruitless and wasteful expenditure receivables are measured at the amount that is expected to be recoverable and are derecognised when settled or subsequently written-off as irrecoverable.

1.15 IRREGULAR EXPENDITURE

Irregular expenditure as defined in section 1 of the PFMA is expenditure other than unauthorised expenditure, incurred in contravention of, or that is not in accordance with a requirement of any applicable legislation, including-

(a) The PFMA.

(b) the State Tender Board Act, 1968 (Act No. 86 of 1968), or any regulations made in terms of the Act.

(c) any provincial legislation providing for procurement procedures in that provincial government.

Irregular expenditure is recorded in the notes to the financial statements when confirmed. The amount recorded is equal to the value of the irregular expenditure incurred unless it is impracticable to determine, in which case reasons are therefore provided in the note.

Irregular expenditure is removed from the note when it is either condoned by the relevant authority, transferred to receivables for recovery or not condoned and is not recoverable.

Irregular expenditure receivables are measured at the amount that is expected to be recoverable and are de-recognised when settled or subsequently written-off as irrecoverable.

1.16 BUDGET INFORMATION

Budgets are prepared on an accrual basis over the 12-month period of the financial year.

A comparison with the budgeted amounts for the current reporting period has been included in the statement of comparison of budget and actual amounts. The reasons for significant variances are disclosed in the notes to the annual financial statements

1.17 RELATED PARTIES

Parties are considered to be related if one party has the ability to control the other party or exercise significant influence over the other party in making financial and operating decisions or if the related party and another party are subject to common control.

Related parties include individuals who have significant influence over the entity, such as members of the Board and key management personnel. Transactions between NMISA and related parties (other than members of the Board and key management personnel) during the reporting period, not on ordinary terms or not in the ordinary course of business, as well as comparative information are disclosed in the notes to the annual financial statements. Board members and key management emoluments are also disclosed.

1.18 EVENTS AFTER REPORTING DATE

Events after reporting date are those events, both favourable and unfavourable, that occur between the reporting date and the date when the financial statements are authorised for issue. Two types of events can be identified:

- those that provide evidence of conditions that existed at the reporting date (adjusting events after the reporting date); and
- those that are indicative of conditions that arose after the reporting date (non-adjusting events after the reporting date).

The entity will adjust the amount recognised in the financial statements to reflect adjusting events after the reporting date once the event occurred. The entity will disclose the nature of the event and an estimate of its financial effect or a statement that such estimate cannot be made in respect of all material non-adjusting events, where non-disclosure could influence the economic decisions of users taken on the basis of the financial statements.

1.19 IMPAIRMENT OF NON-FINANCIAL ASSETS; CASH-GENERATING ASSETS

Assets are classified as cash-generating if the entity intends to generate positive cash inflows from the asset and earn a commercial return that reflects the risk involved in holding the asset. Non-cash generating assets are primarily held for service delivery purposes in terms of NMISA's mandate.

At each reporting date, the entity reviews the carrying amounts of its tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any).

The recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flow is discounted to its present value, using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the assets.

If the recoverable amount of an asset is estimated to be less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. An impairment loss is recognised immediately as an expense.

Where an impairment loss subsequently reverses, the carrying amount of an asset is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior years. A reversal of an impairment loss is recognised immediately as surplus.

1.20 IMPAIRMENT OF NON-FINANCIAL ASSETS; NON-CASH-GENERATING ASSETS

Non-cash-generating assets are assets other than cash-generating assets. When the carrying amount of a non-cash generating asset exceeds its recoverable service amount, it is impaired. At each reporting date, the entity assesses whether there is any indication that a non-cash-generating asset may be impaired.

If any such indication exists, an entity estimates the recoverable service amount of the asset.

The present value of the remaining service potential of a non-cash-generating asset is determined, using one of the following approaches:

- depreciated replacement cost approach;
- restoration cost approach; or
- service units approach.

If the recoverable service amount of a non-cash-generating asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable service amount. This reduction is an impairment loss. An impairment loss is recognised immediately in surplus or deficit.

At each reporting date, the entity assesses whether there is any indication that an impairment loss, recognised in prior periods for a non-cash-generating asset, may no longer exist or may have decreased. If any such indication exists, the entity estimates the recoverable service amount of that asset.

A reversal of an impairment loss for a non-cash-generating asset is recognised immediately in surplus or deficit.

1.21 EMPLOYEE BENEFITS

Short-term employee benefits

The cost of short-term employee benefits, those payable within 12 months after the service is rendered, such as paid vacation leave and sick leave, bonuses and non-monetary benefits (such as medical care), are recognised in the period in which the service is rendered and are not discounted.

Defined contribution plan

Payments to defined contribution retirement benefit plans are charged as an expense as they fall due.

1.22 SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY

In preparing the annual financial statements, management is required to make estimates and assumptions that affect the amounts presented in the annual financial statements and related disclosures. Use of available information and the application of judgement are inherent in the formation of estimates.

Actual results in the future could differ from these estimates, which may be material to the annual financial statements. Significant judgements include: provision for doubtful debts, useful life, residual value and impairment of assets.

Provision for doubtful debts

NMISA estimates the level of provision required for doubtful debts on an ongoing basis, based on historical experience, as well as other specific relevant factors.

Useful lives and residual values of property, plant and equipment

Management made certain estimates with regard to the determination of estimated useful lives and residual values of items of property, plant and equipment, as discussed further in Note 3. An annual assessment and review of estimated useful lives and residual values is performed and any significant change is accounted for as a change in accounting estimate in accordance with GRAP 3.

Impairment

The recoverable service amount of non-cash-generating assets and individual assets was determined, based on the higher of value in use and fair values of assets, less cost to sell. These calculations require the use of estimates and assumptions. It is reasonably possible that the value in use or fair value assumption may change, which may then impact on management's estimation and may then require a material adjustment to the carrying value of assets.

The entity reviews and tests the carrying value of assets when events or changes in circumstances suggest that the carrying amount may not be recoverable. If there are indications that impairment may have occurred, estimates are made for value in use.

The entity assesses its financial assets carried at amortised cost for impairment at each reporting date. In determining whether an impairment loss should be recorded in surplus or deficit, the entity makes judgements as to whether there is observable data indicating a measurable decrease in the estimated future cash flow from a financial asset.

5.9 NOTES TO THE ANNUAL FINANCIAL STATEMENTS

2. NEW STANDARDS AND INTERPRETATIONS

GRAP 20: RELATED PARTIES

The objective of this standard is to ensure that a reporting entity's financial statements contain the disclosures necessary to draw attention to the possibility that its financial position and surplus or deficit may have been affected by the existence of related parties and by transactions and outstanding balances with such parties.

This standard requires disclosure of related party relationships, transactions and outstanding balances, including commitments, in the financial statements of the reporting entity. The effective date of the standard is not yet set by the Minister of Finance.

NMISA has adopted the standard, disclosure of related party relationships, transactions and balances is made in notes 16 and 17 of the annual financial statements.

GRAP 32: SERVICE CONCESSION ARRANGEMENTS: GRANTOR

This standard applies to a contractual agreement between a grantor and an operator in which the operator uses the service concession asset to provide a mandated function on behalf of the grantor for a specified period of time. This standard requires that the grantor shall recognise an asset provided by the operator as a service concession asset if the grantor controls or regulates what services the operator provides. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no service concession arrangements, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

GRAP 108: STATUTORY RECEIVABLES

The objective of this standard is to prescribe accounting requirements for the recognition, measurement, presentation and disclosure of statutory receivables. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no receivables arising from legislative requirements; it is therefore unlikely that the standard will have material impact on the entity's financial statement.

IGRAP 17: SERVICE CONCESSION ARRANGEMENTS WHERE A GRANTOR CONTROLS A SIGNIFICANT RESIDUAL INTEREST IN AN ASSET

This Interpretation of the Standards of GRAP provides guidance to the grantor where it has entered into a service concession arrangement, but only controls, through ownership, beneficial entitlement or otherwise, a significant residual interest in a service concession asset at the end of the arrangement, where the arrangement does not constitute a lease. This Interpretation of the Standards of GRAP shall not be applied by analogy to other types of transactions or arrangements.

A consensus is reached, in this Interpretation of the Standards of GRAP, on the recognition of the performance obligation and the right to receive a significant interest in a service concession asset. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no service concession arrangements, it is therefore unlikely that the interpretation will have a material impact on the entity's annual financial statements.

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. The 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 prescribes what information should be disclosed when an entity is a principal or an agent. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no principal-agent arrangements, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

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 separate financial statements. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no investments in controlled entities, joint ventures and associates, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

GRAP 35: CONSOLIDATED FINANCIAL STATEMENTS

The objective of this Standard is to establish principles for the presentation and preparation of consolidated financial statements when an entity controls one or more other entities. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no subsidiaries or control over any entities, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

GRAP 36: INVESTMENTS IN ASSOCIATES AND JOINT VENTURES

The objective of this Standard is to prescribe the accounting for investments in associates and joint ventures and to set out the requirements for the application of the equity method when accounting for investments in associates and joint ventures.

This Standard shall be applied by all entities that are investors with significant influence over, or joint control of, an investee where the investment leads to the holding of a quantifiable ownership interest. The effective date of the standard is not yet set by the Minister of Finance

NMISA currently has no investments in associates and joint ventures, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

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 controlled jointly (i.e. joint arrangements). This Standard shall be applied by all entities that are a party to a joint arrangement. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no joint arrangements, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statement.

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 and associates, and structured entities that are not consolidated; and the effects of those interests on its financial position, financial performance and cash flows. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no interest in other entities, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

GRAP 110: LIVING AND NON-LIVING RESOURCES

The objective of this Standard is to prescribe the recognition, measurement, presentation and disclosure requirements for living resources; and disclosure requirements for non-living resources. The effective date of the standard is not yet set by the Minister of Finance.

NMISA currently has no living and non-living resources, it is therefore unlikely that the standard will have a material impact on the entity's annual financial statements.

3. PROPERTY, PLANT AND EQUIPMENT

	2017			2016		
	COST R	ACCUMULATED DEPRECIATION AND IMPAIRMENT R	CARRYING VALUE R	COST R	ACCUMULATED DEPRECIATION AND IMPAIRMENT R	CARRYING VALUE R
Furniture and fixtures	5 843 582	(3 654 071)	2 189 511	5 399 797	(3 097 109)	2 302 688
Office equipment	13 130 650	(6 561 765)	6 568 885	10 088 009	(4 323 593)	5 764 416
Plant and equipment	404 955 128	(76 147 967)	328 807 161	237 850 206	(57 469 686)	180 380 520
Motor vehicles	431 308	(311 022)	120 286	239 846	(96 201)	143 645
Leasehold improvements	6 189 124	(1 931 402)	4 257 722	2 899 819	(1 974 427)	925 392
	430 549 792	**(88 606 227)**	**341 943 565**	**256 477 677**	**(66 961 016)**	**189 516 661**

3. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

Reconciliation of property, plant and equipment: 31 March 2017

	OPENING BALANCE R	ADDITIONS R	DISPOSALS R	DEPRECIATION R	IMPAIRMENT LOSS R	TOTAL R
Furniture and Fixtures	2 302 688	526 721	(2 0 661)	(549 380)	(69 857)	2 189 511
Office equipment	5 764 415	3 306 156	(49 759)	(2 240 797)	(211 130)	6 568 885
Plant and equipment	180 380 520	168 817 168	(171 885)	(19 646 554)	(572 088)	328 807 161
Motor vehicles	143 645	191 462	-	(31 746)	(183 075)	120 286
Leasehold improvements	925 393	3 289 304	-	43 025	-	4 257 722
	189 516 661	**176 130 811**	**(242 305)**	**(22 425 452)**	**(1 036 150)**	**341 943 565**

Reconciliation of property, plant and equipment: 31 March 2016

	OPENING BALANCE R	ADDITIONS R	DISPOSALS R	DEPRECIATION R	IMPAIRMENT LOSS R	TOTAL R
Furniture and fixtures	2 258 171	636 535	(2 066)	(512 369)	(77 583)	2 302 688
Office equipment	4 134 909	3 145 242	(4 325)	(1 283 014)	(228 396)	5 764 416
Plant and equipment	96 164 561	97 535 469	(50)	(12 408 965)	(910 495)	180 380 520
Motor vehicles	193 281	-	-	(31 142)	(18 494)	143 645
Leasehold improvements	-	1 041 871	-	(116 479)	-	925 392
	102 750 922	**102 359 117**	**(6 441)**	**(14 351 969)**	**(1 234 968)**	**189 516 661**

Expenditure incurred to repair and maintain property, plant and equipment included in Statement of Financial Performance

	2017 R	2016 R
General repairs and maintenance	4 468 840	3 203 239

4. INTANGIBLE ASSETS

Reconciliation of property, plant and equipment: 31 March 2017

	2017			2016		
	COST R	ACCUMULATED AMORTISATION AND IMPAIRMENT R	CARRYING VALUE R	COST R	ACCUMULATED AMORTISATION AND IMPAIRMENT R	CARRYING VALUE R
Software	5 859 831	(2 685 604)	3 174 227	3 528 352	(1 346 357)	2 181 995

Reconciliation of intangible assets: 31 March 2017

	OPENING BALANCE R	ADDITIONS R	AMORTISATION R	TOTAL R
Software	2 181 995	2 331 479	(1 339 247)	3 174 227

Reconciliation of intangible assets: 31 March 2016

	OPENING BALANCE R	ADDITIONS R	AMORTISATION R	TOTAL R
Software	1 011 970	1 659 318	(489 293)	2 181 995

CHANGE IN ESTIMATE: PROPERTY, PLANT AND EQUIPMENT AND INTANGIBLE ASSETS

During the year the following changes were made to the estimations employed in accounting for depreciation and amortisation of assets:

Change in depreciation and amortisation resulting from reassessment of useful lives.

The following categories are affected	VALUE DERIVED FROM USING ORIGINAL ESTIMATE R	VALUE DERIVED USING AMENDED ESTIMATE R	VALUE IMPACT OF CHANGE IN ESTIMATE R
Furniture and fixtures	710 132	549 380	(160 752)
Intangible assets	1 972 703	1 339 247	(633 456)
Leasehold improvement	781 944	(43 025)	(824 969)
Motor vehicles	36 384	31 746	(4 638)
Office equipment	2 970 347	2 240 797	(729 550)
Plant and equipment	21 151 566	19 646 554	(1 505 012)
	27 623 076	**23 764 699**	**(3 858 377)**

5. INCOME RECEIVED IN ADVANCE

	2017 R	2016 R
Prepayments received from customers	1 158 866	579 665

6. RECEIVABLES FROM EXCHANGE TRANSACTIONS

Trade receivables	3 079 659	2 406 636
Employee advances and other receivables	23 362	111 309
Less: Provision for impairment of trade receivables	(56 681)	(63 611)
	3 046 340	**2 454 334**

NMISA does not hold any collateral as security.

The impairment of trade receivables has been determined with reference to probability of collection of the amounts.

Movement in the provision for impairment of trade receivables

Opening balance	63 611	194 770
Amounts written off as uncollectible	(2472)	(82 800)
Reversed during the year	(4 458)	(48 359)
	56 681	**63 611**

7. INVENTORIES

Raw materials	105 999	55 102
Finished goods	263 405	217 437
	369 404	**272 539**
Inventories recognised as an expense during the year, included under operating expenses	96 865	86 647

Inventory is carried at lower of cost or net realisable value

8. CASH AND CASH EQUIVALENTS

Cash and cash equivalents consist of:		
Cash on hand	12 156	12 000
Bank balances	15 141 326	3 121 910
Short term deposits	183 565 333	226 769 674
	198 718 815	**229 903 584**

There are no restrictions on cash held with banks

Cash and cash equivalents are held with Standard Bank, which is rated AA based on rating agency Fitch Ratings.

9. PAYABLES FROM EXCHANGE TRANSACTIONS

	2017 R	2016 R
Trade payables	13 181 989	10 296 800
Accrued expenses	5 955 322	2 147 863
Other payables	4 295	4 228
Deferred income	33 028	-
	19 174 634	**12 448 891**

10. REVENUE

Rendering of services	12 088 925	11 927 947
Non-exchange revenue	264 193 000	250 895 000
Other income	143 854	1 516 979
Interest received	15 833 226	14 056 783
	292 259 005	**278 396 709**

The amount included in revenue arising from exchanges of goods or services is as follows:

Rendering of services	12 088 925	11 927 947

The amount included in revenue arising from other income is as follows:

Sundry income	92 071	1 458 231
Insurance claims pay-out	51 783	58 748
	143 854	**1 516 979**

The amount included in revenue arising from interest received is as follows:

Interest received – external investments	15 795 898	13 982 056
Interest charged on trade and other receivables	37 328	74 727
	15 833 226	**14 056 783**

The amount included in revenue arising from non-exchange transactions is as follows:

Transfer received from controlling entity towards operating expenditure	101 400 000	96 296 000
Transfer received from controlling entity towards capital expenditure	162 793 000	154 599 000
	264 193 000	**250 895 000**

11. OPERATING EXPENSES

	2017 R	2016 R
Auditor's remuneration	551 209	745 143
Bursaries	1 242 946	1 094 190
Catering, events and meetings	303 038	434 666
Chemicals and lab consumables	6 771 424	3 501 671
Conference fees	245 881	341 454
Consulting and professional fees	624 026	1 350 393
Electricity	2 743 070	3 571 471
External calibration costs	949 970	908 740
Health and safety services	635 058	148 485
Insurance	463 782	484 854
IT expenses	3 802 516	2 612 713
International assessors expenses	46 311	472 965
Lease rentals on operating lease	10 465 319	8 852 821
Marketing and advertising	1 373 825	1 773 421
Other expenses	1 316 515	863 220
PPP project expense	1 608 152	6 165 096
Payroll costs	388 649	309 702
Postage and courier	750 211	594 136
Printing and stationery	1 492 533	1 769 830
Recruitment costs	1 198 388	700 182
SANAS Assessment/Quality expenses	496 269	496 305
Staff welfare	166 040	292 140
Subscriptions and membership fees	707 528	451 903
Technical components	3 722 115	2 704 456
Telephone and fax	710 472	642 688
Training	3 962 477	2 152 337
Travel – local	2 621 317	2 328 562
Travel- overseas	3 569 165	3 911 158
	52 928 206	**49 674 702**

12. EMPLOYEE RELATED COSTS

	2017 R	2016 R
Basic earnings	53 876 110	44 127 850
Temporary Employees	1 079 673	124 475
Performance bonuses	4 424 492	1 979 497
Third party payments*	12 281 562	10 339 691
Unemployment Insurance fund (UIF)	522 443	487 830
Leave pay provision charge	912 153	87 969
Long-service awards	111 015	9 219
Pay As You Earn (PAYE)	19 553 198	15 046 053
Compensation for Occupational Disease and Injuries	142 881	133 396
	92 903 527	**72 335 980**

* Payments include costs related to medical aid, pension fund contributions, group life, etc.

13. CREDIT LOSSES

Provision for doubtful debts and debt written off	36 250	48 359

14. CASHFLOW FROM OPERATING ACTIVITES

Surplus	116 190 898	137 149 216
Adjustments for:		
Depreciation and amortisation	23 764 699	14 841 261
Loss/(profit) on sale of assets	181 031	(234 876)
Credit losses	36 250	(48 359)
Foreign exchange loss	629 644	132 488
Impairment loss	1 036 150	1 234 969
Movement in provision for leave	912 154	87 969
Movement in provision for career ladder Adjustments	497 913	-
Other sundry income – non cash	-	(1 424 086)
Board back pay accrual	-	(107 322)
Changes in working capital:		
Inventories	(96 865)	(272 539)
Receivables from exchange transactions	(628 259)	(116 824)
Prepayments	(1 982 670)	(11 185 210)
Payables from exchange transactions	6 096 099	1 267 279
Income received in advance	579 201	383 405
	147 216 245	**141 707 371**

15. COMMITMENTS

	2017 R	2016 R
Already contracted for but not provided for		
Capital expenditure	91 694 353	148 947 991
Operating expenditure	31 174 230	21 984 296
	122 868 583	**170 932 287**
Not yet contracted for and neither authorised by members		
Capital expenditure	2 000 000	4 699 000
Total capital commitments		
Already contracted for but not provided for	91 694 353	148 947 991
Not yet contracted for and neither authorised by members	2 000 000	4 699 000
	93 694 353	**153 646 991**

The delivery lead times for equipment procured by NMISA can be anything up to a year and in some cases beyond a year. At times, funds are often rolled over annually in the form of commitments, for those awards made for which equipment has not yet been delivered.

NMISA procures specialised equipment (custom made on order or assembled to order according to specification by international manufacturers). Some of the equipment is only used by National Metrology Institutes and the components need to be characterised and tested on assembly. This equipment must be thoroughly tested, verified and calibrated to ensure traceability to International Standards before delivery, since the results generated are used as input into uncertainty of measurement calculations.

OPERATING LEASES

Surplus is stated after the following has been taken into account:		
Operating lease rental expense	10 360 981	8 852 821
Operating leases commitments - Printers		
• within one year	562 058	-
• in second to fifth year inclusive	646 039	-
	1 208 097	**-**
Operating leases commitments - Building		
• within one year	10 059 647	8 821 134
• in second to fifth year inclusive	11 065 612	21 125 259
	21 125 259	**29 946 393**

15. COMMITMENTS (CONTINUED)

SIGNIFICANT LEASE ARRANGEMENTS

Lease rental - Building

The lease relates to the use of Buildings for a total period of eight years, commencing on 01 April 2011. The lease was for an initial period of three years, after the expiry of the initial period the lease period was extended by five years to 31 March 2019. The rental increases on the 01st of April of each consecutive year, the increase will be based on CSIR's annually approved rental rates. The rental is payable monthly in advance.

Lease rental - Printers

The lease relates to the use of Printers for a total period of 36 months, commencing on 01 May 2016. The rental shall be increased annually, by an amount based on the combined effects of currency fluctuations, increase in statutory costs, suppliers price increases and variations in the Consumer Price Index, compounded annually. The rental is payable monthly in arrears.

16. RELATED PARTIES

RELATIONSHIP

Controlling entity	Department of Trade and Industry
Board members	Dr Prinsloo Nevhutalu
	Mr Thembani Bukula
	Ms Tshidi Molala
	Dr Rudzani Nemutudi
	Mr Tshokolo Nong
	Ms Jabu Mogadime
	Dr Cleopas Sanangura
	Dr Tshenge Demana (**the dti** representative)
	Ms Ursula Ntsubane
	Ms Bongani Mathebula
External members of the Audit and Risk Committee	Mr Kgosietsile Kgosiemang
	Ms Poni Ngwato
Members of key management	Mr Ndwakhulu Mukhufhi
	Mr Benjamin van der Merwe
	Ms Phetsile Magagula
	Dr Wynand Louw
	Ms Zakithi Msimang
	Ms Natasha Nel-Sakharova
	Dr Jayne de Vos
	Mr Teboho Mthombeni

16. RELATED PARTIES (CONTINUED)

Entities under common control*	South African National Accreditation Systems (SANAS)
	Companies Tribunal (CT)
	Export Credit Insurance Corporation (ECIC)
	National Empowerment Fund (NEF)
	South African Bureau of Standards (SABS)
	National Credit Regulator (NCR)
	National Gambling Board (NGB)
	National Consumer Commission (NCC)
	National Consumer Tribunal (NCT)
	National Lotteries Board (NLB)
	National Lotteries Trust Fund (NLTF)
	National Regulator for Compulsory Specifications (NRCS)
	Companies and Intellectual Property Commission (CIPC)

* These entities are under common control of the Department of Trade and Industry, of which NMISA for forms part.

All other entities in the National Sphere of Government are considered to be related, but have not been disclosed unless transactions with those entities took place on terms that were not on ordinary terms or not in the ordinary course of business.

KEY MANAGEMENT INFORMATION

Class	Description	Number
Board members	Accounting Authority	10
Executive Committee	Directors	8

17. MEMBERS' EMOLUMENTS

Executive management emoluments 2017

	BASIC SALARY R	PERFORMANCE BONUS R	ANNUAL BONUS R	PENSION CONTRIBUTION R	ALLOWANCES R	OTHER EXPENSES R	TOTAL R
Mr Ndwakhulu Mukhufhi	1 773 744	-	30 612	42 595	-	14 020	1 860 971
Mr Benjamin van der Merwe	865 019	85 712	58 287	82 506	-	3 948	1 095 472
Ms Phetsile Magagula (Resigned 31 March 2017)	1 156 078	52 068	-	85 922	9 004	80 365	1 383 437
Dr Wynand Louw	1 114 002	110 448	-	90 830	103 860	23 435	1 442 575
Ms Zakithi Msimang	909 768	116 997	48 598	68 791	2 651	350	1 147 155
Ms Natasha Nel-Sakharova	965 122	87 278	-	75 817	20 115	6 738	1 155 070
Dr Jayne de Vos	893 531	86 958	57 568	83 347	-	20 041	1 141 445
Mr Teboho Mthombeni (Appointed 01 June 2016)	838 163	-	-	73 586	-	2 706	914 445
	8 515 427	**539 461**	**195 065**	**603 394**	**135 630**	**151 603**	**10 140 580**

Executive management emoluments 2016

	BASIC SALARY R	PERFORMANCE BONUS R	ANNUAL BONUS R	PENSION CONTRIBUTION R	ALLOWANCES R	OTHER EXPENSES R	TOTAL R
Mr Ndwakhulu Mukhufhi	1 633 840	-	27 889	39 229	42 384	12 411	1 755 753
Mr Benjamin van der Merwe	808 743	32 408	54 160	77 109	49 160	20 807	1 042 387
Ms Phetsile Magagula (Appointed 01 October 2015)	558 492	-	-	41 508	-	3 904	603 904
Dr Wynand Louw	1 034 329	41 761	-	84 887	163 581	12 293	1 336 851
Ms Zakithi Msimang	850 512	49 767	45 157	64 288	32 158	3 627	1 045 509
Mrs Natasha Nel-Sakharova	901 983	66 001	-	70 857	353	10 382	1 049 576
Mrs Jayne de Vos	835 393	49 319	54 130	77 894	571	10 516	1 027 823
	6 623 292	**239 256**	**181 336**	**455 772**	**288 207**	**73 940**	**7 861 803**

17. MEMBERS' EMOLUMENTS (CONTINUED)

	2017 R	2016 R
NON-EXECUTIVE MANAGEMENT EMOLUMENTS		
Dr Prinsloo Nevhutalu	50 463	30 126
Mr Thembani Bukula	24 960	10 800
Mr Tshokolo Nong	51 636	35 870
Ms Tshidi Molala	47 473	23 744
Dr Rudzani Nemutudi	56 968	53 780
Mr Kgosietsile Kgosiemang	35 923	19 401
Mrs Jabu Mogadime	44 466	40 910
Dr Cleopas Sanangura	64 690	44 934
Ms Bongani Mathebula	32 822	4 410
Ms Ursula Ntsubane	88 711	41 135
	498 112	**305 110**

Dr Tshenge Demana (**the dti** representative) and Ms Poni Ngwato (employed in the public sector) do not receive remuneration for the meetings they attend.

18. RISK MANAGEMENT

FINANCIAL RISK MANAGEMENT

NMISA's activities expose it to a variety of financial risks, namely liquidity risk, credit risk and market risk (including cash flow risk, interest rate risk and currency risk).

LIQUIDITY RISK

Prudent liquidity risk management implies maintaining sufficient cash. NMISA's primary source of funding is the grants received from **the dti**. NMISA maintains liquidity by limiting capital and operational expenditure within the pre-approved budget.

The table below illustrates NMISA's exposure to liquidity risk from financial liabilities:

2017	CARRYING AMOUNT R	1 TO 3 MONTHS R	6 TO 9 MONTHS R	10 TO 12 MONTHS R	2 TO 5 YEARS R	MORE THAN 5 YEARS R
Trade and other payables	19 174 634	18 618 570	556 064	-	-	-
TOTAL	**19 174 634**	**18 618 570**	**556 064**	**-**	**-**	**-**

2016	CARRYING AMOUNT R	1 TO 3 MONTHS R	6 TO 9 MONTHS R	10 TO 12 MONTHS R	2 TO 5 YEARS R	MORE THAN 5 YEARS R
Trade and other payables	12 448 891	12 076 137	372 754	-	-	-
TOTAL	**12 448 891**	**12 076 137**	**372 754**	**-**	**-**	**-**

18. RISK MANAGEMENT (CONTINUED)

	2017 R	2016 R

CREDIT RISK

Credit risk consists mainly of cash deposits, cash equivalents and trade debtors. NMISA only deposits cash with major banks with high quality credit standing and limits exposure to any counter-party.

Trade receivables are derived from revenue earned by, but not limited to, calibrating equipment for private companies. There is no independent rating and as a result management assesses the credit quality of the customer, taking into account trade references, past experience and other factors. NMISA establishes an impairment that represents its estimate of potential losses in respect of trade receivables.

NMISA is considering all receivables between 90 and 120 days and individually based on payment history for impairment. The provision for impairment is 2% (2016: 3%) of the total receivables book. The majority of the receivables are from the private sector.

The maximum exposure to credit risk is as follows:

Trade receivables	3 079 660	2 406 636
Less: Provision for impairment of trade receivables	(56 681)	(63 611)
Rental deposit	605 419	605 419
	3 628 398	**2 948 444**

As at 31 March 2017, the age analysis of the receivables from exchange transactions net of provision for impairment of trade receivables, was as follows:

Not Past due	2 552 322	1 778 604
Past due 1- 30 Days	383 708	188 916
Past due 31- 60 Days	46 298	55 921
Past due 61 – 90 Days	37 962	-
Past due 90 days and over	2 689	319 584
	3 022 979	**2 343 025**

CASH FLOW RISK

NMISA manages its cash flow risk by aligning the monthly allocation to its estimated monthly activity levels.

INTEREST RATE RISK

NMISA's interest rate risk arises from markets and economic factors, payables, cash and cash equivalents and receivables. NMISA's exposure to interest rate risk is minimal due to the following factors:

- interest is not paid on trade payables as it is the policy of the entity to settle within 30 days of invoicing; and
- The PFMA does not allow for the entity to utilise bank overdraft facilities.

Based on the activities of NMISA, the only area affected by interest rate risk is investment income, earned on call deposits. These call deposits are held short-term and the interest rate is linked to the prime rate. The exposure to the changes in interest rate for short-term deposits is considered immaterial.

18. RISK MANAGEMENT (CONTINUED)

	2017 R	2016 R

NMISA's exposure to the risk of changes in market interest rates relates primarily to cash in call deposits held with banks:

CASH AND CASH EQUIVALENTS

Short term deposits	183 565 333	226 769 674

CURRENCY RISK

NMISA's exposure to currency risk is due to the purchase of specialised equipment from foreign suppliers. To the extent that the transactions are considered to be material, significant suppliers are required to provide firm prices to minimize the risk.

19. GOING CONCERN

The annual financial statements were 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 the settlement of liabilities, contingent obligations and commitments will occur in the ordinary course of business.

20. EVENTS AFTER REPORTING DATE

The Accounting Authority is not aware of any matters that arose after the reporting date that requires adjustment to the financial statement or additional disclosure.

21. CONTINGENT LIABILITIES

20.1 An amount of R 26 409 for the performance bonus of the Director (Physical Metrology) who acted as interim CEO for the 2012/13 financial year is still outstanding. The outcome of this matter will be confirmed by the performance evaluation feedback from the Accounting Authority.

20.2 An amount of R 451 242 for the performance bonus of the CEO for the 2013/14, 2014/15 and 2015/16 financial years is still outstanding. The outcome of this matter will be confirmed by the performance evaluation feedback from the Accounting Authority.

20.3 An application was made to the National Treasury under section 53 (3) of the PFMA to retain the surplus incurred in the current financial year ending 31 March 2017, totalling R116 190 898. Should permission to retain this surplus not be granted, then NMISA may be required to declare a distribution to the National Treasury through its Executive Authority, **the dti**.

22. FRUITLESS AND WASTEFUL EXPENDITURE

	2017 R	2016 R
Opening balance	36 330	32 037
Add: Fruitless and wasteful expenditure – current year	15 612	36 330
Less: Amounts condoned	(36 330)	(32 037)
	15 612	**36 330**

DETAILS OF THE INCIDENTS

A laptop costing R15 612 was paid for and delivered by the supplier, but could not be found on the premises for physical verification purposes. Disciplinary action will be taken against the responsible official.

23. RENTAL DEPOSIT

Rental deposit	605 419	605 419

The rental deposit is refundable to the entity at the end of the lease term.

24. IRREGULAR EXPENDITURE

Opening balance	544 838	1 400 246
Add: Irregular expenditure – current year	-	526 450
Less: Amounts condoned	(526 450)	(1 381 858)
	18 388	**544 838**

The above irregular expenditure is as a result of non-compliance with SCM processes and regulations.

25. RETIREMENT BENEFITS

Contribution to pension fund	12 281 562	7 013 410

NMISA provides retirement benefits through a defined contribution plan to all its employees. The fund is governed by the Pension Funds Act, 1956 (Act No. 24 of 1956). The entity is under no obligation to cover any unfunded benefits.

26. BUDGET DIFFERENCES

26.1 Revenue from sponsorships is significantly below budget due to the DST Materials Characterisation project not materialising because of fiscal constraints and specific Regional development projects under international sponsors being deferred to the following financial year due to the refugee problem in Europe.

26.2. The favourable variance arose due to surplus funds, that have already been committed, yielding a better interest return than anticipated.

26.3. The variance is insignificant, being 2.97% of budgeted employee related expenses, and arose due to increased efficiencies in filling urgent vacant positions.

26. BUDGET DIFFERENCES (CONTINUED)

	2017 R	2016 R

26.4. This is mainly attributed to the planned upcoming repairs to building 6 HVAC and the renovations of the Dioxin Facility in building 4. The funds are committed but not yet expensed.

26.5. T he variance is due to delays in the procurement process, resulting in funds being committed but not yet expensed.

26.6. The procurement for tenders planned for has been concluded. Although these tenders have not yet come through into this report, all of the tenders have been awarded. 85% of the expenditure recorded in the actual year to date figures is in respect of payments towards prior year commitments. NMISA received additional funding from **the dti** towards the recapitalisation project, which includes the replacement of aged equipment and a possible PPP project. Tenders have been awarded for the procurement of equipment but, due to the specialised nature of the equipment and associated manufacturing time, the goods have not yet been received. As a result, the majority of the funds have been committed but expenditure has not yet been incurred. Refer to note 15 for the amount included under commitments.

26.7. Depreciation, impairment loss, other income, credit losses and loss on sale of assets were not budgeted for.

26.8. Foreign exchange variance arose due to unbudgeted exchange rate losses incurred from the deterioration of the Rand.

27. PREPAYMENTS

Prepayments – current asset*	11 612 047	11 209 049
Prepayments – non-current asset*	1 640 046	60 374
	13 252 093	**11 269 423**

NMISA procures specialised equipment (custom made on order or assembled to order according to specification by international manufacturers). Some of the equipment is only used by National Metrology Institutes and the components need to be characterised and tested on assembly. This equipment must be thoroughly tested, verified and calibrated to ensure traceability to International Standards before delivery, thus the delivery lead times for equipment procured by NMISA can be anything up to a year and in some cases beyond a year. As a result, most of the suppliers require a certain portion of the award amount to be prepaid on placement of an order or on completion of certain stages in the production process.

28. PROVISIONS

Reconciliation of provisions - 2017	OPENING BALANCE R	ADDITIONS R	UTILISED DURING THE YEAR R	LEAVE CASHED OUT R	LEAVE CASHED OUT R
Annual leave provision	2 154 504	7 343 003	(6 082 300)	(348 550)	3 066 657
Provision for career ladder Adjustments	-	497 913	-	-	497 913
	2 154 504	**7 840 916**	**(6 082 300)**	**(348 550)**	**3 564 570**

Accumulated annual leave from the previous leave cycle, not taken by 30 September each year, is forfeited. The average number of leave days per employee is 4.28 (2016: 3.93).

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