

# annual report 2005/06



### Our Vision

To create a prosperous society that derives enduring and equitable benefits from science and technology.

### Our Mission

To develop, coordinate and manage a national system of innovation that will bring about maximum human capital, sustainable economic growth and improved quality of life for all.  $\square$ 

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## table of contents

Foreword	2
Preface	6
Introduction	12
Programme 1: Corporate Services and Governance	15
Programme 2: Science and Technology Expert Services	25
Programme 3: International Cooperation and Resources	31
Programme 4: Frontier Science and Technology	45
Programme 5: Government Sector Programmes and Coordination	61
Public Entities	71
Annual Financial Statements	89
Human Resources Oversight Report	141
Corporate Information	152



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### Foreword

Since stepping into the Science and Technology portfolio in April 2004, my challenge has been to lead the department towards our goal of making science and technology a driver for economic growth and social transformation.

South Africa's ability to solve problems, to initiate and sustain economic growth, and to provide clean water, quality health care, adequate infrastructure and a safe food supply all depend, to a large degree, on our capabilities in science and technology.

A number of achievements in the period under review serve to illustrate our progress.

In what was without doubt the most important moment in South African astronomical history, President Thabo Mbeki officially unveiled the largest telescope in the southern hemisphere – the Southern African Large Telescope – in the small town of Sutherland, 400km north of Cape Town.

South Africa's expenditure on research and development (R&D) increased slightly from 0.76 percent in the 2001/02 R&D Survey to 0.81 percent of gross domestic product (across both public and private sectors) in the 2003/04 R&D Survey. It is anticipated that future surveys will show further increases, enabling us to move closer to the target of I percent by 2008/09.

During the reporting period, builders were completing construction of a new, state-of-the-art Department of Science and Technology (DST) headquarters building within the Scientia complex north-east of Pretoria. The complex also houses the National Research Foundation and the Council for Scientific and Industrial Research (CSIR), two key science and technology institutions. We are now part of an extended science and technology precinct that includes the South African National Biodiversity Institute, the Innovation Hub and the Council for GeoSciences as neighbours.

"...making science and technology a driver for economic growth and social transformation" Cabinet has approved the Nanotechnology Strategy. The promise of nanotechnology, and its building block, nanoscience, is that of getting more for less – the use of smaller, cheaper, lighter and faster devices with greater functionality, using fewer raw materials and consuming less energy. The technology is also an effective response to the demands of improving economic growth while maintaining best practices in environmental sustainability. I believe that nanotechnology will drive the industrial revolution in the 21st century, and that is why we are determined to ensure that South Africa joins the quest for the advanced international competitiveness that expertise in this field can provide.

In October 2005, I announced a R26 million, three-year integrated capacity



building and satellite development project, and emphasised my department's view of this as the beginning of a long-term space programme. To this end, this project will result in an increase in satellite engineering capacity and will contribute to future microsatellite technology developments. The project is an initiative of our department and is managed by Stellenbosch University.

The satellite will be developed by SunSpace & Information Systems (Pty) Ltd, with the CSIR's Satellite Application Centre positioned to provide mission control services such as telemetry and tracking. The satellite, currently designated ZA 002, will assist in identifying areas that will benefit from increased access to space technology and data, as well as areas that may need further encouragement to achieve the relevant objectives of the New Partnership for Africa's Development (NEPAD) and the Millennium Development Goals.





### Foreword

Alongside this technology development and capacity building project, we undertook to formulate a comprehensive national space policy and to establish a space agency. These will provide the regulatory and implementation framework respectively for our endeavours in space. Discussions are under way with Algeria, Kenya and Nigeria about the possibility of launching a low earth orbiting satellite that will provide data to address the most crucial of Africa's development objectives: food security, infrastructure

development, the improved management of land and water resources, and disaster management.

We continue to make good progress with our bid to host the US\$1,5 billion Square Kilometre Array radio telescope - the largest in the world - in the Northern Cape. If the bid is successful, this will translate into foreign direct investment of R9 billion, with a spin-off of major contracts for South African engineering companies. Plans are under way to build the Karoo Array Telescope in the Northern Cape. This telescope – a partnership between my department and the Northern Cape provincial government, and driven by a dedicated innovation team - will become operational in 2009.

We have also played a leading role in implementing Africa's Consolidated Science and Technology Plan of Action, which was adopted by the African Ministerial Council on Science and Technology, in Dakar, Senegal, in September 2005. The plan articulates Africa's common objectives, and its commitment to collective actions to develop and use science and technology for the socioeconomic transformation of the continent, and its integration into the world economy.

As part of the work of the Cabinet's Economic Cluster, DST took the lead and established an interdepartmental R&D task team in 2005. This involved DST, National Treasury, the Department of Trade and Industry, and the Office of the Presidency. The task team examined the tax environment for South African businesses and developed a structured portfolio of actions to promote private sector spending on R&D.This became part of the 2005 Government Programme of Action for the Economic Cluster.

We then commissioned an econometric modelling study on tax incentives to inform the work of the task team. Different scenarios were examined using various types of tax incentives employed by countries as instruments for productive investment, with attention to the expected effects of such instruments on the economy and the private sector. The task team's assessment provided a convincing argument that the social and economic spillover benefits of R&D are larger than the private returns to companies performing R&D. These findings are backed up by empirical work done internationally.

Informed by the findings of the study, the task team made recommendations to the National Treasury for improving the R&D tax allowance already provided to businesses.

During the past year, my department has welcomed a new Director-General, Dr Phil Mjwara. We trust the skills he brings will benefit the department and facilitate the achievement of our goals.

In the year ahead, I am confident that all these exciting initiatives will be given further impetus with DST's characteristic vigour and determination.

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Mosibudi Mangena Minister of Science and Technology

### Preface

Government has set ambitious but realistic targets to achieve higher levels of economic growth. We are well on track – most analysts say that we are likely to hit the 6 percent growth target well before 2010, and many argue that there is no reason why we cannot achieve an even higher level of growth.

Growth is a means to an end, and the ultimate goal is a substantial improvement in the lives of our people. Shared growth does not mean that there will be some kind of "trickle-down" to the poor – it means that our programme to eradicate poverty, and to provide all our people with access to clean running water, decent sanitation, electricity, and better education and health services, is an integral part of our chosen economic growth path.

We need to apply the best of our country's scientific expertise to ensure that our policies and programmes have maximum positive impact on the lives of the poor, and that they are sustainable in the face of scarce and dwindling resources.

Below are some of the key programmes that illustrate the work underpinning DST's contribution to economic growth and sustainable development over the past year.

## Promoting technology-based activities

Our economy requires a dynamic small business sector. It was in recognition of this, as well as the realisation that there was a serious gap in the provision of technical support to small, medium and micro enterprises (SMMEs), that the Tshumisano Trust was set up. The programme aims to improve the innovative capacity and competitiveness of SMMEs.

The Tshumisano Trust supports 10 technology stations covering a range of needs in diversified sectors, including chemical engineering, electronics,

"...the ultimate goal is a substantial improvement in the lives of our people" materials and processing technologies, moulded plastics, and clothing and textiles. These technology stations are based at technology universities and technikons around the country.

During the year under review, DST established a technology station focusing on food-processing technologies at the Cape Peninsula University of Technology. South Africa's fresh produce exports account for R12 billion in foreign exchange revenue. This sector's future growth will rely in large part on technological innovation.



### The future of energy

During the year under review, DST and the Department of Minerals and Energy set up the South African National Energy Research Institute. SANERI, as this institute will be known, is housed at the Central Energy Fund. A total of R20 million has already been transferred to the Central Energy Fund to get the work going, and we will invest more than R100 million over the next three years to develop knowledge and applications in this field.

SANERI is expected to generate new ideas and to develop practical guidelines for how we can best take advantage of what nature offers us in the form of clean and renewable energy. Every country has its own potential renewable energy resources: some have enormous hydroelectricity potential; others have biomass or wind power. Derek Hanekom Deputy Minister of Science and Technology

### Preface

### **Solar panels**

Harnessing the huge energy potential from sunlight in our own sunny country is a good starting point. Solar panels are reliable and are already cost-effective in certain applications, such as for providing power to remote locations. The cost of panels has decreased more than twenty-fold over the past two decades. Present research focuses on further reducing costs to a level that will enable widespread use. It is generally



accepted that this goal will be achieved through the introduction of solar panel technologies involving a variety of new materials.

During the year under review, scientists from the universities of Johannesburg, Port Elizabeth and Pretoria have been working in a consortium on this project. The successful establishment of a solar panel industry, driven by local expertise, offers tremendous potential for addressing South Africa's economic and social challenges. Our department is contributing R13 million to this work over the next three years.

### Solar water heating

Electricity generation through solar panels is not the only way to capture free energy from sunlight. Commercial solar hot water systems can be bought on the market and, in fact, it makes economic sense for all of us to convert to solar geysers. The problem is that they are still far too expensive for poor people, many of whom do not have the luxury of hot water in their homes.

DST has been piloting a very low-cost solution to address this problem through the design of a simple solar hot water system. The parts cost about R350 and are readily available at any local hardware store. The geyser can be put together using normal household tools.

### Hydrogen fuel cells

Our search for clean energy and reducing our reliance on fossil fuels has led us in another very promising direction. One of the major hopes for alternative energy lies in the development of the potential of hydrogen, in what has been termed "the hydrogen economy". This is a hypothetical future economy in which the primary form of stored energy is hydrogen, which would be used to run vehicles (rather than petrol or diesel). Hydrogen is abundantly available and does not pollute.

Platinum is the key catalytic material used in hydrogen fuel cells. With South Africa enjoying 80 percent of the world's known platinum deposits, it is clear that this field could open up exciting new opportunities.

During the year under review, we have been developing an R&D strategy for hydrogen and fuel-cell technologies. The draft strategy has been allocated an initial budget of R10 million.

### **Biofuels**

Biofuels represent another potential source of clean and renewable energy, and excellent work is being done in partnership with the Department of Minerals and Energy. The principle is that organic matter can be converted directly into liquid fuels. The two most common biofuels are ethanol and biodiesel. During the year under review, work has been completed on the technical standards for biodiesel, and tests have been conducted on six candidate crops: soya, sunflower, canola, groundnut, cotton and jatropha.

The biofuels industry initiative, apart from reducing our reliance on fossil fuels, promises substantial job creation and new business development opportunities.

### Preface

### **Energy-efficient housing**

During the year under review, DST in conjunction with the departments of Housing, and Water Affairs and Forestry, has been working on a project to improve household energy efficiency. This initiative has a dual objective: the reduction of unnecessary and wasteful energy consumption, and achieving greater comfort in our homes through better design and use of different materials.

In Buffalo City, six demonstration houses have been built. These houses are orientated to benefit from the warming power of the sun, and make use of dry sanitation to reduce the energy required to treat and pump potable water and sewage. The houses will also use insulated concrete forms and ceilings that have better thermal properties than brick or concrete blocks.

### Appreciation

I would like to thank the Portfolio Committee on Science and Technology for the great support they have given us in our work; to extend my appreciation to the Minister for the solid leadership he provides in the sector; and to thank all members of the department for the passion and dedication with which they tackle their work.

On that note we have to commend and say goodbye to Rob Adam, who has played a huge role in bringing our system to where it is today, as we welcome Phil Mjwara, our new Director-General, whom we are confident will take us to even greater heights.

Derek Hanekom Deputy Minister of Science and Technology

"...we welcome Phil Mjwara, whom we are confident will take us to even greater heights"





### Introduction

I have the honour of submitting the 2005/06 Annual Report of the Department of Science and Technology, in terms of the Public Finance Management Act (1999).

Upon joining DST at the end of the period under review, it struck me that I had become part of an institution undergoing significant changes in its efforts to place

"...it has been a long and exciting ride for the department, which has indeed achieved great things"

the study and practice of science and technology at the centre of our life as a nation.

By the time I became Director-General, a solid foundation for a coordinated and growing science system had already been laid thanks to the efforts of my predecessor, Dr Rob Adam, and his management team. The key foundation has been the formulation and implementation of the National Research and Development Strategy. Under this strategy, key programmes in areas such as biotechnology, astronomy, and manufacturing technology have been put in place. National programmes in areas such as nanotechnology and high performance computing are poised for imminent rollout. In addition, a range of cross-cutting initiatives, such as the Innovation Fund and the Centres of Excellence and Research Chairs programmes, are now up and running.

It has been a long and exciting ride for the department, which has indeed achieved great things. Post-1994, science has been practised in a more popular and accessible way. Witness, for example, the spectacular recent launch of the Southern African Large Telescope.

However, progress requires tackling a range of complex and interconnected national challenges. At the heart of these challenges is educating a new generation of scientists and skilled technical professionals. At the moment, there are too few students entering science and engineering programmes in higher education. Moreover, a very low proportion of these undergraduates move into related post-graduate research. The end result is that our country, which is richly endowed with talent and possibility, has too few of its citizens working in science and technology.

This is a matter of the utmost importance and the department is devoting major resources to resolving the dilemma. We plan to work in tandem with the Department of Education to enable South Africa's higher education institutions to produce more scientists and engineers. Attention must also be given to enhancing career prospects in science and technology, and increasing the time that younger academics devote to research.

We have to find ways to tap into our existing resources (at universities and science councils) with innovative thinking to make sure we increase the numbers. We also require incentives to ensure that we keep more science graduates in the research system. One possibility is to create research internships that allow students to earn an income as they work towards post-graduate qualifications. We need to improve coordination to ensure the science system produces the right skills to boost South Africa's economy.

For the second year in a row, DST has attained an unqualified audit report on the vote account and we have managed to spend 99,84 percent of our budget. I am particularly proud of this, which is the result of diligent and coordinated work by all in the department. It is indicative of our approach to financial matters and signals that we are unified in the attainment of all our goals.

DST has seen many successes since 1994. However, we still have a challenging road ahead to realise our goals. In the years to come, it is imperative that we go



beyond policies and programmes, and implement! To this end, my management team and I look forward to a productive working relationship with the Minister and Deputy Minister.

Dr Phil Mjwara Director-General Department of Science and Technology

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Dr Phil Mjwara Director-General



Peter Pedlar

Group Executive: Corporate Services and Governance



### Programme I: Corporate Services and Governance

This programme conducts the overall management of the department, provides core support services and manages the governance and reporting system. Core support services include communications, information technology, human resources management, legal services and internal auditing. The programme ensures that funded science and technology institutions comply with good corporate governance practices and are aligned

### Communications

The year under review saw the further development and implementation of DST's communications strategy, which aims to profile and position the department in relation to both internal and external stakeholders. The rollout of the strategy has helped to significantly raise the profile of DST in the media and among the general public. Specific communication campaigns have been developed and implemented and a wide



### highlights during the year under review

with the strategic focus of the national system of innovation. It also monitors and evaluates the science councils.

The focus of Corporate Services and Governance has been bedding down the changes brought about by DST's new programme structure, including integrating services and systems, and aligning institutional governance frameworks across all public sector science, engineering and technology institutions. range of information products have been produced for numerous DST events and press briefings. These include: National Science Week; the Women in Science Awards; the African Ministerial Council on Science and Technology; the Rand Show; SA/UK Day; the 2005 Budget Vote; the Aichi World Expo 2005 in Japan; the launch of the Africa-Japan Essay Competition in Japan; bilateral cooperation agreement signing ceremonies; and the launch of the Southern African Large Telescope (SALT).

Continuous engagement with key stakeholders in the science and technology system – including science

councils, other government departments and science communicators – also contributed to media interest and a generally improved image of DST.

The production of a monthly internal staff newsletter, Insite, and the development and implementation of DST's intranet have helped to improve internal communication. The department also successfully developed and implemented a new and improved website (www.dst.gov.za).

Support for the ministry has been greatly strengthened through coordination with the ministerial liaison officer in the Minister's office. Support activities to the offices of the Minister and Deputy Minister include clear and timely briefings, accompanying



and welcoming to publicity and launch events, press briefings, speechwriting and editing, and media releases and statements for key activities.

DST has successfully developed its corporate identity in line with the guidelines issued by the Government Communication and Information System, and makes sure that the department's branding is visible and consistent.



### Programme I: Corporate Services and Governance

#### Human resources management

The department has developed a strategy to attract and retain skills that are in high demand nationally and internationally. As part of implementing this strategy, and to position human resources management to support DST's core business units, the department undertook two studies.

The first study examined the nature and extent of turnover within DST, and benchmarks DST against

other departments for purposes of comparison. The results of this study show that the area of greatest concern for DST is the middle-management band, where in terms of percentages, DST lost more employees than the average of all surveyed departments. The administrative and clerical band is also fairly vulnerable. The results indicate that the majority of employees leaving DST move to other public service departments, and are therefore not completely lost to government.

The communications unit organised this event, which highlighted South Africa's innovation and diversity in the field of science and technology.

Science and Technology month began with the launch of a special exhibition at the South African Pavilion at the Aichi World Expo on I June 2005. Said Minister Mangena: "In addition to our discussions with key roleplayers and professionals in the sector, we hope to interest and stimulate the Japanese public in South Africa's multi-faceted and exciting science programmes and initiatives, and to showcase investment opportunities."

Presentations during the month included:

 A series on South Africa's world-leading African Coelacanth Ecosystem Programme by Dr Tony Ribbink, programmes manager at the South African Institute for Aquatic Biodiversity

- Lectures by world-renowned Phillip Tobias, Professor Emeritus of Anatomy and Human Biology at the University of the Witwatersrand Medical School, and Director of the Sterkfontein Research Unit, on "The Evolution of Mankind: the Significance of the Fossil Hominid Discoveries at the Cradle of Humankind World Heritage Site near Johannesburg, South Africa"
- A lecture on South Africa's plant life and biodiversity by Gideon Smith, Chief Director of Research and Scientific Services at the South African National Biodiversity Institute and Professor of Botany at the University of Pretoria.

As part of the broader programme, Minister Mangena, Ambassador Ben Ngubane and the South African delegation met with the representatives of the Japanese government.

Science and Technology Month in Japan – June 2005

The second study investigated the creation of a professional stream with a specific focus on the science profession within the department. This study shows that remuneration and rewards play a critical role in acquiring, motivating and retaining staff. Organisations employing professionals in scientific and engineering fields face many challenges. Various national and international studies indicate that the demand for skilled scientific staff in many areas far outweighs the supply. The greater international mobility of workers seeking the best rewards in these specialised fields contributes to the brain drain. This makes it critical for organisations to be innovative and flexible in designing systems to retain their professional employees.

A key event during the month was a science and technology policy forum, entitled "Enhancing the National Innovation System for Sustainable Social and Economic Development".

Science and Technology month attracted tremendous interest from scientists, policymakers, investors, entrepreneurs, and those with particular interest in marine biology, icthyology, palaeontology, botany, astronomy, anthropology, and other disciplines. It also had a broad appeal to schoolchildren, families and all those with an interest in exploring their world and broadening their horizons.





## Programme I: Corporate Services and Governance

"...implementing an integrated internship programme to encourage experimental learning" In the next stage of this process (in the next reporting period) the department will discuss the findings of these studies with the Department of Public Service and Administration.

To address the problem of unemployed science graduates, DST and the National Research Foundation (NRF) are implementing an integrated internship programme within DST and across the science system to encourage experiential learning. Interns are placed within DST and the science councils to get good work experience aligned with their level of qualification and area of specialisation. The programme provides work experience to unemployed graduates specialising in science, engineering and technology, and research and development. The objective of the internship programme is to build a pool of human resources, skills and competencies that are critical to the science system.

### Governance

#### **Synthesis review**

DST completed the synthesis review of South Africa's science and technology system in February 2006. The review panel was made up of five members –four local and one international.

The purpose of the synthesis review was to assess the extent to which science, engineering and technology institutions (SETIs) have implemented the generic and specific recommendations of the 1997 system-wide review. The recommendations of the 1997 review covered a number of important aspects of governance, including system-wide independent oversight and evaluation; appropriate governance and advisory structures; the creation of links and interactions across disciplines, sectors and institutions; and how organisations can freely conduct research, development and demonstration activities within the boundaries of a clearly defined mandate. The recent synthesis review also identified universal problems

with implementation and the related implications for government's science and technology system.

The synthesis review took into account how the individual SETI's output contributes to the realisation of national goals or international commitments, the scientific quality of the outputs, the quality of the institution's management, and the role of an institution's board or council in providing strategic direction.

## Draft governance policy for science, engineering and technology institutions

The National Research and Development Strategy has highlighted the need for a strategic approach to the management of the state-funded portion of South Africa's science and technology system, and a new strategic model was formulated in response to the strategy. A key action for implementation is the development of a policy on governance standards for SETIs. In response to this requirement, and in line with the objective of harmonising governance systems within all public science and technology institutions, DST developed the Draft Policy on Governance Standards. After thorough discussion of the document within DST, the Minister approved the draft policy for circulation to the SETIs.

The DST also participated in the recent review by the National Treasury and the Department of Public Service and Administration, of public entities and state-owned enterprises. The review revealed gaps in institutional governance frameworks. The department is reviewing the enabling legislation of the various public entities in its domain to ensure that there is harmonisation with the Public Finance Management Act and best practice in corporate governance.

#### Transfer of CSIR governance and budget to DST

The President approved and gazetted the transfer of the governance and budget of the CSIR from the Department of Trade and Industry to DST effective from I April 2005. This was in response to the decision taken at the January 2002 Cabinet Lekgotla, Cabinet's approval of South Africa's National Research and Development Strategy in July 2002, and Cabinet's acceptance of the new strategic model for the management of the publicly funded portion of the national science and technology system in October 2004.

DST initiated and ran the process of reconstituting the CSIR's board, whose term of office was to end on 31 December 2005. Cabinet approved the new board, composed of six members and the chairperson, Ms N Shikwane. The new board will serve for the period I January 2006 to 31 December 2008.



### Programme I: Corporate Services and Governance

#### **National Research Foundation**

During the year under review, Cabinet approved the appointment of a new board for the National Research Foundation (NRF) for a three-year term effective from I July 2005. To ensure continuity, Cabinet approved the reappointment of three previous board members, as well as Prof BD Reddy as chairperson of the board for a second term.



#### **Shareholder compacts**

According to Treasury regulations, the accounting authority of a public entity listed in Schedule 2, 3B or 3D must, in consultation with its executive authority, annually conclude a shareholder's compact. Despite the fact that the Human Sciences Research Council (HSRC), the Africa Institute of South Africa and the NRF are Schedule 3A entities, and therefore excluded from this requirement, Cabinet recommended that they should also conclude shareholder compacts with their executive authority. DST has for the first time prepared and presented a shareholder's compact template to the department-based science councils to complete. The compacts, which serve as formal performance agreements between the Minister of Science and Technology and the boards of science councils, reflect the expectations of each party expressed in terms of outcomes and outputs that need to be achieved. The compacts will be signed in the next financial year.

#### **DST** representatives appointed on boards

In support of the new governance framework, one of the key immediate actions for implementing the new strategic model for the management of the publicly funded portion of the national science and technology system has been for DST to have representatives on the boards of a number of its entities. So far, it has facilitated the appointment of representatives to the boards of the Agricultural Research Council, Mintek, the South African National Energy Research Institute and the Water Research Council.

#### Legislation

In line with the broad governance objective of harmonising institutional structures and reporting systems, DST has started to review all legislation administered by the department.

The HSRC Act (1968) was considered outdated and a new HSRC Bill drafted. If passed by Parliament and signed by the President, this would repeal the 1968 act. The bill will be presented to Cabinet during the next financial year.

The National Research Foundation Act, Africa Institute of South Africa Act, Academy of Sciences of South Africa Act, National Advisory Council on Innovation Act and South African National Scientific Professions Act were also reviewed. It was decided that it would be prudent to have an overarching bill, the Science and Technology Laws Amendment Bill, which will encompass amendments to these acts. The bill will be presented to Cabinet in the next financial year.

With the transfer of the administration of the CSIR from the Department of Trade and Industry to DST in April 2005, the CSIR Act had to be brought in line with DST's mandate. The CSIR Amendment Bill will be presented to Cabinet in the next financial year.

### Vision for the year ahead

In the year ahead, this programme will focus on consolidating the gains made over the past year, appropriately capacitating Corporate Services and Governance to deliver superior service and to provide enhanced customer satisfaction.





Dr Adi Paterson Group Executive: Science and Technology Expert Services



### **Programme 2:** Science and Technology Expert Services

In this programme, an integrated resource group works to optimise research and innovation management, policy capacity and effective implementation. The staff work as a flexible and responsive expert service, providing the expertise and resource base to deliver on crucial national system of innovation (NSI) initiatives for the line programmes and DST leadership, and the NSI more broadly. This approach ensures that there is optimal use of crucial resources. Science and Technology Expert Services maintains a set of core skills in DST, and uses a network of specialists and service providers to complement and leverage its capabilities.

Areas of expertise include the hydrogen economy; nanotechnology; space science and astronomy; palaeontology; human capital for science, engineering and technology; and biotechnology. During the period under review, the programme supported a number of the department's initiatives, which are described under programmes 3, 4 and 5.

## The Academy of Science of South Africa

DST commissioned the Academy of Science of South Africa to prepare a report on publications and scientific journals. Presented to the Minister in February 2006, the report made recommendations now under consideration by DST and the Department of Education.

## National Advisory Council on Innovation

Science and Technology Expert Services hosts the secretariat of the National Advisory Council on Innovation (NACI) and coordinates interactions on key issues between the ministry, DST and NACI.

NACI is a statutory council that advises the Minister of Science and Technology on innovation, and develops science and technology indicators. The NACI secretariat forms part of this programme's staff complement, and the NACI budget is reflected in its budget. Resource allocations are made under the direction of the council.

NACI housed the Reference Group for South African Women in Science between 2003 and March

 The Framework for Intellectual Property from Publicly Financed Research was developed and presented to Cabinet in January 2006 and approved for public consultation.

### highlights during the year under review

2006. NACI is also setting up the Biotechnology Advisory Committee, which will operate as one of its subcommittees.

Outputs of the NACI secretariat during the period under review included advice prepared for the council and presented to the Minister on:

- Improving the use of research findings to enhance the return on public R&D investments
- The potential impact of skills shortages on the innovative capacity of major capital engineering projects, and potential solutions to this problem

 Measures to minimise the negative effects associated with the mobility of highly skilled workers, while capitalising on the positive aspects of this trend.

The secretariat focused on the following studies:

- Mapping the NSI to determine the strengths and weaknesses of the system
- · Promoting innovation and competitiveness in the business sector
- Improved use of human resources in the NSI
- Best practices in policy and governance in science, engineering and technology institutions.
- In collaboration with the Square
  Kilometre Array Office, draft legislation on astronomy geographical advantage areas was developed and approved by Cabinet for public consultation in November 2005.

The programme's group executive co-chairs the science and technology committee of the Group on Earth Observations (GEO). In February 2006, the co-chairs initiated the programme of work, followed by a meeting in March with the GEO Secretariat in Geneva.

### **Grant-in-aid**

The programme also administers a grant-in-aid budget. Funds go to events and initiatives outside the department, but which fall within the department's areas of interest.

DST supports science, engineering and technology events based on unsolicited proposals that meet qualifying criteria. This applies particularly where a proposal is strongly aligned to the activities of line programmes, or where there is potential for attracting young researchers to events that they would not normally attend. Support is given in the form of partial funding.



## Programme 2: Science and Technology Expert Services

Initiatives supported by DST in 2005/06 included:

- The M-Learn Conference 2005, Cape Town: This major international "mobile learning" conference is a research and networking event for researchers, strategists, educators, technologists and practitioners from around the world.
- The 8th Annual SAASTEC Conference, November 2005, KwaZulu-Natal: The South African Association of Science and Technology Centres represents the science centres of the Southern African Development Community region. It aims to strengthen the institutions by creating networks around their activities. The institutions play a key role in developing educators.
- National Consultative Conference of Black Science, Technology and Engineering Professionals, March 2006, CSIR, Pretoria: A landmark event, the conference brought together about 200 black science, engineering and technology professionals from around the country to look at the challenges they face as professionals and within the sector in general.
- Dr Thembele Hille of the CSIR was sponsored to attend the Asian Nano Forum Meeting in Geelong, Australia, in December 2005. He joined senior decision-makers from Asian countries to find practical ways of improving interactions through common policy initiatives, sharing infrastructure, joint R&D projects, and education and exchange programmes – all matters relevant to South Africa's nanotechnology initiatives.
- A gala event addressing awareness, stigma and education around HIV and Aids, using the creative arts as a medium.
- The International Council for Local Environmental Institutions World Congress, February 2006, Cape Town: This was in support of local government initiatives in innovation and sustainable development. The council is the largest international association

"...based on a modern and integrated national system of innovation"



of local government organisations that have made a commitment to sustainable development, representing more than 475 cities, towns, counties, and their associations worldwide.

- Two conferences held under the auspices of the Africa Genome Education Institute: Genetics and Social-Ethics Aspects of Human Variation in Colour and Health, and Biological Science Leadership in Africa. The Africa Genome Education Institute is devoted to the public understanding of modern biology and its implications for our lives.
- Targeted funding for student participation and international speakers at the 6th South African Conference on Applied Mechanics, January 2006: This conference is held every two years as a forum for presenting the latest developments in all branches of applied mechanics.
- SciTech 2006 event for learners, March 2006: The programme included talks, workshops, competitions, demonstrations and exhibitions, the content of which was aligned to specific learning outcomes in the national curriculum. The event emphasised innovation and creativity, the applied sciences and technology and study, and career and entrepreneurial opportunities.
- The 17th Chris Engelbrecht Summer School in Theoretical Physics, January 2006: The event attracts South African postgraduate physics students. This year's theme was the dark side of the universe.
- International Bio-hydrometallurgy Conference, Cape Town, September 2005: The aim was to look at industrial application and fundamental academic research to explore overlaps and opportunities.
- The administration of financial grants to support a portfolio of project activities of the South African Research and Innovation Management Association between I September 2005 and 31 March 2007.
- DST Women in Science Awards. These annual awards, given in Women's Month, recognise and celebrate women in science as a direct response to the National Research and Development Strategy's focus on improving the quality of life of South Africans.

### Vision for the year ahead

In the year ahead, Science and Technology Expert Services will deepen the expertise of the team so that the quality of programme implementation continues to improve. This, in turn, should have a material impact on the quality of lives of all South Africans, based on a modern and integrated national system of innovation.



Dhesigen Naidoo Group Executive: International Cooperation and Resources



### Programme 3: International Cooperation and Resources

International Cooperation and Resources develops and manages bilateral and multilateral agreements, and strategic international partnerships, to strengthen the national system of innovation (NSI). It works to emphasise the role of science and technology in South Africa and on the African continent. The programme has developed strategies to increase access to global research funding, foreign investment and official development limited. However, the proportion of international funding leveraged for R&D in South Africa grew from essentially zero in 1994 to more than 10 percent of all funding in 2003/04 – and the upward trend has continued over the past two years.

Over the past 12 years, South Africa's international science and technology engagement has been driven by two overarching principles: sustainability and mutual benefit. This approach has paid off in a tangible way,

- Strengthening strategic partnerships More South African participation in the European Union's (EU) Sixth Framework Programme (FP6); progress with proposals for dedicated funding for science and technology from the European Programme for Reconstruction and Development; and preparation of the Cooperation Framework on Innovation Systems between South Africa and Finland.
- Developments in multilateral cooperation The second African Ministerial Conference on Science and Technology, where the Consolidated Plan of Action for Science and Technology in Africa was adopted.

### highlights during the year under review

assistance. It is also creating technological intelligence capacity to monitor and evaluate international science and technology trends, and to leverage South Africa's competitive advantage in new and innovative technologies. Underpinning all these activities is the programme's goal of positioning South Africa as a preferred destination for R&D collaboration and investment.

In its pre-1994 state of political isolation, South Africa's contact with the world scientific community was very

as borne out by two major recent developments: first, the Southern African Large Telescope (SALT), in which international partners are responsible for 66 percent of financial contributions to date; and second, the establishment by German software giant, SAP, of its first R&D facility in Africa – the SAP Research Centre in Pretoria. Through partnerships initiated with the department, SAP has made longterm financial and training commitments to support science and technology human capital development in South Africa.

### Strategic partnerships

#### **European Union's Sixth Framework Programme**

The Framework Programme<sup>1</sup> is the EU's main funding instrument for science, technology and innovation. It supports research cooperation and the integration of research efforts, and promotes researcher mobility and the development of research infrastructures. It also coordinates and invests in mobilising research, technological development and demonstration. South Africa is an active participant in the programme.

- Developments in bilateral cooperation Deepening relationships with France, the United Kingdom, Germany, Belgium, Norway and Japan.
- Strengthening South Africa's position as a preferred science and technology destination – Successfully completing South Africa's bid to host the world's largest radio telescope – the Square Kilometre Array – and preparation of South Africa's bid to host the third major international laboratory of the International Centre for Genetic Engineering and Biotechnology.

During the review period, South Africa managed to secure R80 million from the FP6 competitive funds for R&D. On the whole, South African institutions, including science councils, universities, SMMEs and non-governmental organisations enjoyed access to R&D projects worth more than R500 million.

FP6 priority areas are genomics and biotechnology for health, information society technologies, nanotechnologies and nanosciences, materials and manufacturing, aeronautics and space, food safety, sustainable development, and economic and



<sup>&</sup>lt;sup>1</sup> The EU established the framework Programme in 1983 to address European research priorities. Since its introduction, six cycles have been launched. South Africa has been participating actively since the Fourth Framework Programme.

social sciences. South African researchers performed best in biotechnology and genomics for health, food safety and food quality, global change and ecosystems. South Africa has achieved important recent successes in the information and communication technology, space and transport fields.

DST is currently preparing the South African research community to actively participate in FP7, to be launched in early 2007.

## European Programme for Reconstruction and Development

There have been important negotiations between the department and the EU delegation in South Africa about possible instruments to support science and technology under the European Programme for Reconstruction and Development (EPRD). Most of the support will go towards alleviating poverty, stimulating the economy, generating employment, and promoting growth. During the review period, DST and the EU delegation here conducted several studies to look at possible instruments for EPRD support to the department, including sector budget support<sup>2</sup>.

### European - South African Science and Technology Advancement Programme

Launched in June 2005, the European - South African Science and Technology Advancement Programme promotes scientific and technological cooperation between South Africa and the EU. It is funded by the European Commission as an FP6 specific support action, implemented and co-funded by DST.

A key programme objective is to promote research mobility between South Africa and the EU. This will help to attract skilled European researchers to work in South Africa, while South African researchers will be able to gain experience working in top European laboratories and facilities. The programme also maps out directions for research projects, and helps researchers locate partners.

Programme priorities are: creating a dedicated platform and branding for South African-EU science and technology cooperation; supporting South Africa's participation in FP6 and preparing for FP7; marketing South Africa's science and technology excellence in Europe; and exploiting synergies with other international cooperation activities, especially bilateral links with European countries.

The structure of this programme is widely regarded as a best practice model for emerging economies and developing countries to promote science and technology cooperation with the EU.

### Cooperation Framework on Innovation Systems between South Africa and Finland

DST and the government of Finland have agreed to establish the Cooperation Framework on Innovation Systems between South Africa and Finland. The aim is to draw on Finland's unique experience in innovation systems development and leverage the expertise it has accumulated over the past 25 years. The framework will be funded to an amount of about R30 million under the SA-Finnish development cooperation programme. Specific framework objectives include improving policy support for the NSI, the development of provincial innovation systems (especially in Gauteng, Eastern Cape and Western Cape), pilot rural innovation interventions for poverty alleviation, and promoting shared learning on innovation systems with countries in sub-Saharan Africa.

### **Group on Earth Observation**

The Group on Earth Observation (GEO) is an international partnership consisting of 44 member countries and 26 participating organisations. Earth observation provides crucial data yielded from space, airborne, terrestrial or ocean-based platforms that

<sup>2</sup> Sector budget support is provided in support of sector policies/programmes, and the use of the funds is limited to government expenditure in the sector.


tell us about the state of the planet, making this an invaluable tool for policy-making and development. The applications of earth observation range from estimating crop yields to monitoring water and air quality, and from improving airline safety to predicting the weather.

The GEO has created a new Global Earth Observation System of Systems (GEOSS). This will considerably strengthen coordination and interoperability (such as data exchanges) between existing national and regional observation systems, focusing specifically on the needs of developing countries. A 10-year implementation plan for GEOSS has been adopted. DST has seconded one of its employees to work on this plan at GEO's offices in Geneva on a two-year contract.

South Africa has been a co-chair of GEO since it was founded in 2003, along with the US, the EU and China.

# **Multilateral cooperation**

South Africa continues to play a leading role in multilateral cooperation through a range of international forums.

#### **Organisation for Economic Cooperation and Development**

South Africa has increased its participation in various subsidiary bodies of the Organisation for Economic Cooperation and Development (OECD), including the Committee for Scientific and Technological Policy, the Technology and Innovation Policy, and the Working Party on Biotechnology. For example, DST co-hosted the International Scientific and Technological Cooperation Workshop for Sustainable Development in November 2005. At the workshop there was consensus on the central role that well-designed international science and technology initiatives can play in steering developing economies towards sustainable development. The outcome of the workshop will drive the OECD's sustainable development agenda.

#### **International Centre for Genetic Engineering and Biotechnology**

South Africa's collaboration with the International Centre for Genetic Engineering and Biotechnology is discussed later in this chapter (see "Positioning South Africa as a preferred science and technology destination").

#### **Other developments**

As part of strengthening South–South cooperation, Cabinet approved South Africa's membership in the Centre for Science and Technology for the Non-aligned and Other Developing Countries.

# Programme 3: International Cooperation and Resources

### African cooperation

Science and technology plays a critical role in Africa's efforts to eradicate poverty; achieve food security; fight diseases such as malaria, tuberculosis and HIV and Aids; reverse environmental degradation; and increase the pace of industrialisation. The initiatives described below highlight these efforts.

#### African multilateral relations

# African Ministerial Conference on Science and Technology

The first African Ministerial Conference on Science and Technology (AMCOST) was held in Johannesburg in 2003 under the auspices of NEPAD and in partnership with DST. Since then, South Africa has continued to be the driving force in developing the plan of action.

AMCOST, which has been consolidated within the framework of NEPAD programmes and African Union structures, provides policy and political guidance on developing and implementing science and technology programmes for the African continent.

At its second meeting, held in Dakar in September 2005, AMCOST adopted the Consolidated Plan of Action for Science and Technology in Africa, which proposes a number of programmes and interventions aimed at:

- Intensifying regional cooperation in science and technology
- Promoting the application of science and technology to achieve the Millennium Development Goals
- Promoting innovative ways of financing science and technology in Africa.

The outcome of nearly two years of regional consultation, the plan was overseen by the AMCOST Ministerial Bureau, chaired by Minister Mangena.

"...science and technology plays a critical role in Africa's efforts to eradicate poverty"

#### Southern African Development Community

Within the Southern African Development Community (SADC) region there has been good progress in policy development harmonisation. There is also a greater drive for cooperation on joint regional projects. DST played a key role in the process of building science and technology competence within the SADC Secretariat and applying the Consolidated Plan of Action for Science and Technology in Africa in the SADC context. Since December 2005, SADC ministers of science and technology have been meeting regularly to discuss an SADC science and technology forum, which will soon be formalised. The SADC Integrated Committee of Ministers has adopted the SADC Framework for Science, Technology and Innovation.

#### **African bilateral relations**

During the review period, DST continued to formulate and strengthen bilateral relations on the continent. DST engagements in Africa are focused on the following principles:

- · Establish relations with willing partners
- Foster research partnerships with significant African partners (affiliated centres of multilateral institutions and participants in the African Peer Review Mechanism)
- Accelerate development and formalisation of relations with countries with appreciable emerging economic potential
- · Formalise relations with key decision makers
- Develop strategies for an integrated approach with other line function departments.

In line with these principles, DST established two new cooperation agreements:

- Trilateral cooperation with Botswana and Namibia on a geological survey
- Trilateral cooperation with Senegal and France on laser technology.

In addition, South Africa is holding discussions with Lesotho on incubators, indigenous knowledge systems, public understanding of science and technology, and tissue culture.

#### The Commission for Africa report

The Commission for Africa report was released in London in March 2005. To address poverty and stagnation, the report calls for:

- Debt relief for Africa's poorest countries
- A US\$25 billion a year increase in aid to Africa by 2010
- A further aid increase of US\$25 billion by 2015.



# Programme 3: International Cooperation and Resources

South Africa was actively involved in developing the report, and DST helped to write the science and technology components. This has resulted in the pledge of US\$500 million for the next 10 years and a further US\$2 billion for the development of new institutions in Africa, in support of the Consolidated Plan of Action for Science and Technology in Africa.

Proposals are now being drawn up to engage funds for specific projects.



### **Bilateral cooperation**

In the period under review, the department oversaw the signing of 35 bilateral agreements. These include new inroads into central Europe. Cooperation with Hungary and Romania has been significantly strengthened. Cooperation with Russia is making good progress through institutional agreements and the mobility of scientists in areas such as space, mathematics, nuclear energy and new materials. A science and technology agreement with Slovakia was successfully negotiated for signing later in 2006.

The following cooperative agreements included support for science and technology in the rest of Africa.

Science and technology relations between South Africa and France have strengthened with the introduction of two large research and development projects – the SA-France ICT Network and SAFe-Water initiatives. The ICT project involves the CSIR's Meraka Institute and the SAFe-Water projects involve the Water Research Commission, in collaboration with the French Embassy and French research institutions. The two countries have pledged matching funding for these initiatives, which have the potential to develop into regional projects.

France

In January 2006 DST, together with the UK's Office of Science and Technology, organised a successful South Africa Day in the UK to showcase South African science and technology, and promote cooperation with British scientists and researchers. Both countries have agreed to renew the research networking scheme for another three-year period, with matching funding from both sides to promote collaboration between scientists. The UK's Royal Society and the National Research Foundation (NRF) jointly manage the programme, which focuses on astronomy, biotechnology, energy, climate change, and advanced manufacturing and materials.



United Kingdom

Since it was concluded in 1996, the South Africa-Germany Science and Technology Agreement has led to the implementation of at least 96 jointly funded research projects. The larger projects funded under this cooperation agreement include Inkaba ye Africa, which focuses on the understanding of the dynamic interactions between the earth and its life-support systems; and Biota South, which is concerned with biodiversity in the region and is one of the larger scientific activities in Africa funded by the German Federal Ministry of Education and Research.

Germany

# Programme 3: International Cooperation and Resources

"...a net flow of scientific information and other resources into South Africa..."

#### South-South interaction

The bilateral relationships cited above ensure not only a net flow of scientific information and other resources into South Africa and the region, but also provide the framework for other relationships, such as South–South interaction.The continuing trilateral cooperation between India, Brazil and South Africa is a good example of this.

### **Official development assistance**

The UK's Department for International Development (DFID) has initiated discussions on cooperating with five Southern African projects. These will include plant genetic conservation and utilisation through tissue culture, and training support for science and technology policy development in the SADC region.

Negotiations with the Japanese International Cooperation Agency (JICA) involved exploring the establishment of the Southern African node of the African Institute for Capacity Development in South Africa. The programme will help small-scale farmers with water management, improve crop yield, and introduce new farming methodologies and technologies. JICA will also consider funding a regional training programme on intellectual property management for Southern African institutions' intellectual property managers.

The success of the electronic engineering programme at Tshwane University of Technology has attracted interest from France, and discussions are under way with DST on establishing a similar institute at the Cape Peninsula University of Technology.

Canada and the International Development Research Centre are keen to establish strategic relations with DST and to establish regional ICT partnerships in the SADC region. Negotiations, at an early stage, point to a positive outcome. The bilateral agreement between South Africa and the Government of Flanders was signed in 1996 and by 2005, a total of 97 projects were jointly funded. The cooperation in scientific research over this period represents R8.8 million invested by South Africa, and R5.7 million by Flanders. A workshop to celebrate 10 years of cooperation was held in Cape Town in March 2006.

South Africa and Norway have agreed to extend their research cooperation programme, the goal of which is to establish the basis for long-term research cooperation through the funding of joint research projects in areas such as oceanography, health and education. Given the successes in the collaborative programme (2001-2004), the plan has been extended to 2009.

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Norway

Belgium

Since the successful Science Forum held in 2004, South Africa and Japan have greatly strengthened their relationship. South Africa has participated in the Aichi Expo, Science and Technology Month (see box in programme 1), an innovation forum, and more than 10 joint research projects in areas such as new materials, information technology and biotechnology.

Japan

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# Programme 3: International Cooperation and Resources

# Positioning South Africa as a preferred science and technology destination

A number of exciting developments show that South Africa is increasingly becoming an attractive destination for large-scale science and technology initiatives.

# The Square Kilometre Array radio telescope



Along with Australia, China and Argentina, South Africa is on the short-list to host the world's largest radio telescope, the Square Kilometre Array (SKA).

The bid documents were officially submitted in December 2005. This involved months of preparation to finalise all the technical parameters for this highly sophisticated instrument, which is set to cost nearly RI billion and could attract an additional R9 billion in foreign investment. The bid is jointly managed by DST and the NRF.

If South Africa is successful, the core part of the telescope will be built in the Karoo region of the

Northern Cape. But as the SKA stations will be spread over a vast land area, seven other African countries are joining in the bid – with stations as far away as Ghana, Kenya, Madagascar and even Mauritius.

The winning bidder will be known in 2008.

### International Centre for Genetic Engineering and Biotechnology

The South African National R&D Strategy has identified biotechnology as one of the key technology platforms from which to address our economic and social challenges.

The Institute of Infectious Diseases and Molecular Medicine at the University of Cape Town has been selected as South Africa's candidate to host the third major international laboratory of the International Centre for Genetic Engineering and Biotechnology. The other two are in Italy and India.

DST will contribute R22 million towards the establishment of the laboratory over the next three years. This is in addition to the R2,5 billion used for the rollout of the National Biotechnology Strategy over the same period, which includes the projected contributions by DST, other public entities and the private sector.

# Vision for the year ahead

DST will broaden and deepen our international outreach and partnerships in 2006/07 to consolidate South Africa's status as a preferred international science and technology destination.

This will involve working even harder to win the right to host international science and technology facilities and infrastructure in South Africa. Top of this list is the SKA radio telescope. South Africa will also host major conferences to advance the global science and technology agenda, including a G77 ministerial conference on science and technology in South Africa's year as chair of the developing country group; the



Information Society Technologies in Africa conference; and the Africa Knowledge Conference, co-hosted with the World Bank and the government of Finland.

In this period we will also sign bilateral agreements with Argentina, Mali, Mozambique and Slovakia. We will help to create dedicated science, technology and innovation capacity within the SADC Secretariat.

We will also be part of the international call for increased global investment in science and technology for development, and to make this a major component of the economic relations between developed and developing countries, as well as a key component of strengthening South-South relations.



The event brought together leading UK and South African scientists in the fields of biotechnology and infectious diseases, energy and climate change, and advanced materials.

South Africa Day raised awareness in the South African and UK scientific communities about opportunities to collaborate and possible funding mechanisms to support this collaboration. Furthermore, it offered an outstanding opportunity for leading South African and UK scientists to network with each other.



# South Africa Day in the United Kingdom



Dr Bethuel Sehlapelo Group Executive: Frontier Science and Technology



# Programme 4: Frontier Science and Technology

Frontier Science and Technology provides leadership to develop the national system of innovation (NSI). The programme focuses on harmonising activities in research, development and innovation in industry, academia and research institutions. The programme's chief objective is to build programmes within the NSI, particularly using the resources of DST and its institutions, to ensure that South Africa has an evolving, world-class science and lighter and faster devices with greater functionality, and which use fewer raw materials and consume less energy. Nanotechnology is set to revolutionise business in the 21st century. DST is determined to ensure that South Africa joins the race to become internationally competitive in nanotechnology. Possible applications include:

 The development of intelligent drugs that allow for slow release of medicine into the body for the treatment of diseases such as TB or HIV

- Inauguration of the Southern African Large Telescope (SALT) by President Mbeki-
- Launch of the Nanotechnology Strategy
- Construction of South Africa's second microsatellite
- Developing an integrated national space programme
- Launching the Meraka Institute with the Department of Communications.

### highlights during the year under review

technology portfolio, and a thriving, expanding and representative human capital base. Focus areas include astronomy, human palaeontology and indigenous knowledge systems.

### Nanotechnology

Cabinet has approved DST's Nanotechnology Strategy. The strategy is the outcome of extensive consultation and a study of international best practice.

Nanotechnology promises to produce smaller, cheaper,

- Programmable nano-machines that can clean up waste dumps, or even human arteries
- Nanosensors that can measure changes in the environment, such as moisture levels and temperatures.

The strategy focuses on the essential building blocks of nano-science, namely synthesis, characterisation and fabrication. In line with this, the strategy is aimed at increasing the number of nanotechnology characterisation centres in South Africa, with an investment of R170 million over the next three years.

# Space science and technology

# Low earth orbiting satellite

DST has developed an integrated national space programme to give South Africa affordable access to space technology. In line with this, South Africa's second microsatellite is being built and will be launched later this year. The satellite, which will weigh approximately 80 kilograms, will rotate the earth at a height of about 500km.





# Programme 4: Frontier Science and Technology

DST, the University of Stellenbosch, SunSpace and Information Systems, and the CSIR Satellite Application Centre are partners in this satellite venture.

Beyond issues of prestige, space assets are critical enablers for societies. In terms of South Africa's particular needs, this low earth observation satellite will serve as a research vehicle that can support:

- Disaster management
- Food security
- Health
- Infrastructure
- Land use
- Safety and security
- Water resource management
- Stimulation of greater innovation through the creation of high-value products and services.

The university manages the project, trains postgraduate students, and conducts research of satellite engineering and software development. SunSpace is building the satellite, and the CSIR Satellite Application Centre will be responsible for operating, tracking and monitoring the device.

The department views this as the beginning of a long-term space programme. The project forms an integral part of the Group on Earth Observation global programme, in which South Africa is an active participant. (See programme 3 for more details.)

# Information and communication technologies

#### High performance computing

On 17 May 2005, DST and the Department of Communications jointly launched the Meraka Institute at the CSIR. Meraka – also known as the African Advanced Institute for ICT – is a deliverable in within

"...beyond issues of prestige, space assets are critical enablers for societies"



the Government Programme of Action for the Economic Cluster.

The need for high performance computing infrastructure for a range of applications has been expressed and DST aims to set up a Centre for High Performance Computing (CHPC) within Meraka. The CHPC will be a national frontier initiative and facility, providing computing infrastructure and a research platform to support scientists, engineers and technologists in performing cutting-edge R&D.

The research objectives are to provide high-end computing and computing expertise for all research and applications in South Africa, including the sciences, medicine, engineering business applications and social sciences. The CHPC will foster research addressing challenges such as HIV and Aids, climate change and new paradigms for the World Wide Web, such as grid and semantic web applications for business, the Global Earth Observation System of Systems (GEOSS) and the Square Kilometre Array (SKA) radio telescope simulations.

Research in the initial three-year operational cycle of the CHPC will include applying modelling and imaging technologies in sectors such as mining and materials-related industries, health and pharmaceuticals, the climate, astronomy and astrophysics.

The CHPC and the South African Research Network (SAnRen) (see programme 3), form the backbone of an emerging national cyber-infrastructure. This infrastructure will support research initiated in other elements of the science and technology infrastructure, such as the SKA, the National Bioinformatics Network and the GEOSS.

#### **Open source software**

Some estimates put internet usage in Africa at about 1 user for every 250-400 people, compared to a world average of about 1 user for every 15 people, and a North American and European average of about 1 user for every 2 people. This digital divide leaves the vast majority of Africans unable to access an important tool for survival in today's information economy. President Thabo Mbeki has expressed concern about this and believes that a powerful way of bridging the divide is by adopting open source software.

In 2002, the National Council on Innovation (NACI) made a number of recommendations related to open source software, including:

- Making open standards a non-negotiable base for ICT in the public sector
- Encouraging government agencies and public institutions to use open source software whenever feasible
- Promoting open source software in pre-commercial R&D projects financed with public money.

# Programme 4: Frontier Science and Technology

"...South Africa is committed to biotechnology" Since then, DST has made important strides. It now has a draft Open Source Software Strategy and has set up a task team to coordinate Free and Open Source Software (FOSS) activities across all sectors. Both NACI and DST have committed themselves to migrating to an open source IT environment. The National Bioinformatics Network, one of a number of DST-funded biotechnology agencies, has adopted open source software as a development platform for R&D tools in bioinformatics; the Meraka Institute has prioritised FOSS as a key programme; and the State Information Technology Agency has also been instrumental in driving the national FOSS project, while formulating its own migration plan.

# **Biotechnology**

South Africa is committed to biotechnology, supported by a vibrant research sector. The biotechnology sector is attracting a fast-growing portion of R&D funding. Funding for genetic engineering grew by 360 percent between 2002 and 2004. Investment growth in related fields – biochemistry, genetics and molecular biology, microbiology, genetic engineering and biotechnology – exceeded 46 percent.

We are also committed to developing biotechnology on a continental level. In August 2005, the CSIR, representing South Africa, initiated a southern regional hub of the NEPAD African Biosciences Initiative. Research related to agriculture, human and animal health, environment and industry is being prioritised.

The development and commercialisation of new products and businesses has continued through the Biotechnology Regional Innovation Centres (BRICs). Below we discuss work being carried out by a range of these centres.

#### **BioPAD**

Based in Pretoria, BioPAD's project portfolio consists of the key focus areas of mining, environmental and

industrial bioprocessing, and animal health biotechnology. Some diseases, such as tuberculosis, are easily transmittable to animals and may endanger several rare animal species. In addition, the risk to human health posed by uncontrolled animal diseases could have a devastating economic impact. The need for control measures is therefore critical. BioPAD continues to support the rich history of South African vaccine development and animal production by funding platforms that cover DNA vaccines, unique drug delivery systems, and genetic approaches to breeding of disease-resistant animals. Bioinformatics, proteomics and genomics are integral to further improving animal vaccine development.

#### LIFElab

This Durban-based BRIC focuses on human health and industrial biotechnology. LIFElab has established a biofermentation technology platform supporting manufacturing capability for diagnostic components, especially monoclonal antibodies. LIFElab will contribute to this effort by developing R&D facilities with limited production capacity in partnership with small biotech companies. Further projects focus on vaginal microbicides for preventing HIV transmission, and the use of indigenous knowledge in the treatment of childhood diarrhoea. LIFElab is developing a biotechnology cluster at Umbogintwini, south of Durban. The cluster's activities will include diagnostics, R&D platforms, manufacturing facilities and clinical research infrastructure. Sectors to be represented are genomics, liquid fermentation, therapeutics and traditional medicines.

#### **PlantBio**

PlantBio's portfolio includes transgenic crops, biosafety, conventional breeding and marker-assisted selection, in-vitro propagation, and biofertilisation. PlantBio commissioned a feasibility study to determine the need for a biosafety and regulatory platform.The results point to the need for a platform that will generate safety data, facilitate regulatory approval of GM products and support the national biosafety framework. Although modern biotechnology is being increasingly adopted, none of the commercial products in the domestic market are based on indigenous technologies and expertise.This limits the opportunities for research and products that are relevant to the needs of subsistence farmers.

#### **National Bioinformatics Network**

The National Bioinformatics Network institution aims to develop bioinformatics capacity, especially among disadvantaged groups, and to perform bioinformatics research that can facilitate biotechnology innovation. The network has a nodal structure at eight universities that it has partnered with to invest in technology R&D, infrastructure and teaching.



# Programme 4: Frontier Science and Technology

"...hydrogen and fuel cells are believed to be the energy solutions for the 21st century"

# Public Understanding of Biotechnology programme

During the reporting period, this programme underwent review to determine whether it was delivering on its mandate following its three-year pilot. The review was positive. The programme will continue with its aim of promoting a clear understanding of the potential of biotechnology and to ensure broad public awareness, dialogue and debate on its current and potential future applications, including genetic modification. This is achieved through exhibitions, workshops, theatrical productions, and print and broadcast media for targeted engagement with learners, scientists, the media and the general public.

### 2nd Bio2Biz conference

The 2nd Bio2Biz conference was a major success, drawing more than 300 delegates to Sandton, and with international speakers giving talks on the biotech landscape in their regions. Bio2Biz SA 2005 included the National Bioinformatics Network. The Biotech Africa Exhibition was held in conjunction with the conference.

### **The Innovation Fund**

Recent highlights from the Innovation Fund include the establishment of a zirconium plant for downstream products with associated value-added chemical lines.

The launch of the Geratech Zirconium plant in Johannesburg marked the expansion of an Innovation Fund market research project. With money from the fund, Geratech developed technology that allows it to compete in the rapidly growing global market for downstream zirconium products, with multibillion rand market potential. To date, most of South Africa's raw zircon ore has been exported with little or no value addition. Geratech's facilities now enable the production of high-value downstream products, which



will contribute significantly to the economy, leading South Africa to become an exporter of zirconium chemicals and oxides, rather than lower value zircon ore.

Another highlight is orbital eye implants. The commercial launch of Eyeborn (Pty) Ltd – a R9 million Innovation Fund research project – will soon see locally developed orbital eye implants becoming widely available for less than half the cost of competing imported products. In future, the Innovation Fund's investment will be used as a platform to promote BEE in high technology start-ups.

The Innovation Fund continues to promote the commercialisation of innovative ideas through the national innovation competition.

### The hydrogen economy and fuel cells

Hydrogen and fuel cells are believed to be the energy solutions for the 21st century. The transition to hydrogen as a primary source of energy would greatly reduce dependency on oil and gas, and reduce carbon dioxide emissions, especially when used in efficient fuel cells. In line with the South African National Research and Development Strategy, DST has identified the hydrogen economy and fuel-cell technologies as an area of frontier science and technology that could yield multiple social and economic benefits.

DST has taken the lead in the development of the hydrogen economy initiative, which will harness aspects of the Sasol technology, pebble bed modular reactor technology and fuel-cell technology to create a globally competitive energy mix. The hydrogen economy will be supported by the development of a fuel-cell technology platform that contributes to the beneficiation of platinum, while positioning South Africa to develop cutting-edge research.

In the spectrum of technologies that interconnect to construct the hydrogen economy, platinum plays a crucial role as a catalyst that converts hydrogen to electricity. South Africa has most of the world's known platinum deposits.

Cabinet approved the establishment of an intergovernmental committee, chaired by DST, on the broader implications of the hydrogen economy in the South African context. The Draft Hydrogen Economy Innovation Strategy was completed and the next phase will involve the initiation of priority research projects.

# Human capital initiatives

The National Research and Development Strategy proposes a range of measures to improve the supply and the quality of skilled researchers urgently needed in the NSI. The production of new knowledge, and the supply of knowledge producers and skills capable of converting knowledge to tangible outputs for economic and societal benefit, is the backbone of any national system of innovation. There is already a much better understanding of the constraints to human capital development. A number of programmes are in the pilot phase, notably DST's post-doctoral fellowship, and the science and technology research and professional development programmes. The Research Chairs Programme has generated great excitement in our research community. In the year under review, the Human Resources for Knowledge Production Conference highlighted the programmes aimed at addressing the lack of highdepartment delivers on its mandate of promoting public understanding of and engagement with science, engineering and technology. DST's collaboration with the Department of Education has helped to broaden coverage of the event, reaching out especially to rural areas. A five-year project plan (2005-2009) for National Science Week was formulated, entitled "Tomorrow's science and technology are in our youth's hands." The plan emphasises our indigenous knowledge systems, and in the context of the provinces,

DST is very involved in getting young people interested in careers in science, engineering and technology. The Youth into Science Strategy national consultative conference was held in October 2005 and Minister Mangena gave the opening address. Participants included representatives of science councils, science centres, government departments, the private sector, non-governmental organisations, SADC countries, institutions of higher learning and youth formations. The strategy will be presented to Cabinet this year. The department hopes to attract dedicated resources to complement the expansion of the Dinaledi Programme, which is aimed at improving senior certificate results in maths and science, by providing career guidance



level skills required to advance the NSI.

DST's Centres of Excellence programme has seen the establishment of six world-class centres of research in strategic areas, and more are being planned.

### **National Science Week**

In May 2005, National Science Week 2005 was celebrated in all provinces. The event was launched by Minister Mangena in Limpopo. The aim of National Science Week is to showcase, celebrate and inspire innovation. It is one of the ways in which the it will showcase scientific areas where South Africa has unique geographic and knowledge advantages. National Science Week 2005 also featured activities that recognised the International Year of Physics.

### **Science platforms**

#### **Square Kilometre Array**

The SKA is a R1 billion international project to create a receiving surface of 1 million square metres, 100 times larger than the biggest receiving surface now in existence. South Africa is a strong contender to host the SKA site and submitted final bid documents in December 2005. DST is drafting a bill to establish astronomy reserves that will sustain a geographical competitive edge for Southern Africa.

### Karoo Array Telescope

The Karoo Array Telescope (KAT) is South Africa's demonstrator telescope in its bid to host the SKA site. The KAT will be designed to have a modular and scalable upgrade path, and will consist of 20 parabolic dishes, each 10-15 metres in diameter. KAT will not only demonstrate South Africa's engineering competence

and extending the Network of Science Centres Programme. This will be an effective tool for tracking young people with potential, and introducing new measures to alleviate the financial burden on successful undergraduate students to enable them to pursue full-time post-graduate research.



and improve its chances of hosting the SKA, but will also serve as a test bed for R&D, as well as related digital signal processing and software efforts. The KAT prototype, to be completed in 2007, will be based at the Hartebeesthoek Radio Astronomy Observatory.

### Southern African Large Telescope

SALT, one of South Africa's flagship science projects, is the single largest optical telescope in the southern hemisphere. On I September 2005, SALT reached a milestone by achieving its scientific "first light" – meaning that the full array of mirrors, together with the telescope's new imaging camera, were fully operational for the first time.



# Programme 4: Frontier Science and Technology





A "giant eye in the Karoo"

President Thabo Mbeki inaugurated the SALT on 10 November 2005. More than 1 000 invited guests from South Africa and abroad attended the event, arriving in Sutherland by bus that morning. The 40-strong local and international media contingent had been bussed to Sutherland the previous day.

About 30 km from Sutherland, the flat koppie on which the telescopes stand can be seen in the distance. The dome of the 74-inch telescope can usually be glimpsed as a white speck. SALT's dome, however, is unmistakable.

"Even those of us who know nothing about astronomy," the President said, "have awaited this day with great anticipation, feeling, perhaps instinctively, that this giant eye in the Karoo would tell us as yet unknown and exciting things about ourselves." He expressed his wish that the bid to host the SKA radio telescope would be successful, further enhancing the complex of astronomical establishments in Southern Africa: SALT, HESS in Namibia, and the planned Karoo Array Telescope (KAT).

"This observatory is a place dedicated to the pursuit of knowledge," the President said. "Its sole purpose is the discovery of the unknown, and therefore the further liberation of humanity from blind action informed by superstition that derives from failure to fathom the regularities and imperatives of the infinite natural world.

"Out of this place, enveloped by the quiet peace of the Karoo and its starlit skies, must and will come the message that thought is humanity's step-ladder out of Hades – that ignorance is nothing but condemnation to live for eternity in the world inhabited by the souls of the dead. By communicating to all humanity the evolving and ever-changing truths about the universe, this observatory, empowered by cutting edge science, engineering and technology, and staffed by the most excellent and daring inquiring minds, must help to free us from the seductive grip of the astrologers and the false consciousness that wears the fine apparel of pernicious common sense."



In closing, the President said: "I am especially privileged to command the Southern African Large Telescope to begin its work and focus its eye on the infinite and vibrant depths of outer space and time past. Let the work begin!"

So saying, he unveiled the inaugural plaque. Amid loud applause and camera flashes, SALT was officially online.

- Auke Slotegraff



# Programme 4: Frontier Science and Technology

"...an assessment is under way to map the establishment of the Cape Town Antarctic Gateway"

### South African National Antarctic Programme

DST has finalised the Antarctic Research Strategy for South Africa, which will inform research direction in the next five years. DST has broadened the scope of research themes so that they speak to both the pure science and social science communities. The strategy is associated with an increase in research activity and a renewed commitment by South Africa to full participation in research conducted in Antarctica and the Southern Oceans. An assessment is under way to map the establishment of the Cape Town Antarctic Gateway for research support, South Sea logistics management and a public visitor centre.

#### **International Year of Physics 2005**

The International Union of Pure and Applied Physics declared 2005 the International Year of Physics to raise awareness of the importance of physics for sustainable development. The year coincided with the centenary of Albert Einstein's Annus Mirabilis, during which he published his three theories that revolutionised our understanding of the physics.

The South African International Year of Physics 2005 steering committee, chaired by DST, coordinated activities geared towards promoting physics among the public, especially girls and individuals from previously disadvantaged communities. Activities included physics olympiads, camps, public lectures and media broadcasts. South Africa also hosted the International Union of Pure and Applied Physics General Meeting in Cape Town, and the World Conference on Physics and Sustainable Development in Durban.

# World Conference on Physics and Sustainable Development

The objective of the World Conference on Physics and Sustainable Development, held in October/ November 2005, was to clarify the role of physics and to formulate international action plans. Minister



Mangena delivered the opening address at the conference, the themes of which were physics education, physics and economic development, energy and the environment, and physics and health.

#### Women in Physics in South Africa

Women in Physics in South Africa (WiPiSA) was launched in November 2005 as part of the International Year of Physics. The principal aim of WiPiSA is to address issues relating to the under-representation of girls and women in physics. In 2006, WiPiSA has three core activities: conducting a baseline study to provide explicit statistics on the status of women in physics in South Africa; hosting a physics camp for girls with representation from each province; and hosting a career orientation and guidance workshop for first-year physics students.

#### **Biosciences platform**

The African Coelacanth Ecosystems Programme (ACEP) continued to receive support to sustain research activities. ACEP participated in the activities of Science and Technology Month in June 2005 in Japan. DST hosted a marine research indaba in Cape Town during July 2005. Various stakeholders in the marine sciences were brought together to discuss approaches to develop marine research on the east coast. In November 2005, ACEP was reviewed to assess performance since its inception in 2002. The review report will guide future developments in marine research.

#### **African Origins Platform**

The Wits University palaeontology department has been supported by the African Origins Platform to maintain the national fossil collections and sustain research. In October 2005, Wits University's Bernard Price Institute of Palaeontology celebrated 60 years of palaeontological ventures with a symposium titled "The Story of Life:A new perspective on South Africa's 3.5 billion year fossil record." In January 2006, Wits University Medical School also hosted a symposium titled "African Genesis: A symposium on hominid evolution in Africa."

The Palaeo-Anthropological Scientific Trust was supported to maintain research support in strategic areas and develop human capital.

#### Vision for the year ahead

In the current financial year Frontier Science and Technology will focus on enhancing the effectiveness of existing initiatives, developing human capital for the NSI, and strengthening research infrastructure – especially with regard to emerging technologies such as nanotechnology and high performance computing.

#### 5



Marjorie Pyoos

Group Executive: Government Sector Programmes and Coordination



# Programme 5: Government Sector Programmes and Coordination

This programme provides technology leadership and support to other government departments in relation to sector-specific research, development and technology, and directed human capital programmes. It builds partnerships and programmes to ensure the appropriate contribution of science and technology within different sectors. Accelerated technological change brings challenges and opportunities for all sectors of the economy. One of DST's critical tasks is to give assistance to different sectors – such as manufacturing, transport, health and crime prevention – to develop appropriate strategies, and to make the right investments in technology and R&D. Customised programmes, such as the South African Aids Vaccine Initiative and the South African National Energy Research Institute (SANERI) have already been set up with the relevant departments to respond to specific challenges.

- Energy sector research has been strengthened with the establishment of SANERI
- The Science Conference helped to raise awareness among industry, government and development specialists about the challenges of climate change
- The ICT sector saw important developments with the launch of the Meraka Institute, the architectural design of the South African National Research Network (SANReN) and the draft ICT Research and Development Strategy sent to Cabinet

# highlights during the year under review

One consequence of the new governance framework has been the dismantling of the Science Vote. This has been replaced by a new planning framework in which individual departments report on their own R&D spending through the National Treasury's Estimates of National Expenditure mechanism. In keeping with this new framework, the programme helps line departments develop five-year R&D plans for their sectors. To provide a birds-eye view of R&D investment across government, and to improve decision-making about such funds, the programme also prepares an annual national science and technology expenditure plan.

# Contributions to information and communications technology

### South African National Research Network

SANReN is one of the department's major ICT initiatives. SANReN is a high-speed network that will enable the exchange of research data between South African research institutions and their counterparts around the world. Once it is fully operational, SANReN will connect some 45 institutions through a 10-20 gigabyte national backbone and a 2.5 gigabyte international connection. If South Africa wins the Square Kilometre Array radio telescope bid, the data transmission demand will increase exponentially.

The greatest demand for bandwidth currently comes from:

- The Hartebeesthoek Radio Astronomy Observatory
- The Centre for High Performance Computing
- The High Energy Physics Collaboration at UCT with CERN (the world's largest particle physics facility, based in Switzerland)
- The Southern African Large Telescope
- R&D tax incentives were given a major boost
- Future planning will be more coherent with development of the integrated expenditure plan for science and technology reporting in all government departments.

The National Bioinformatics Network.

DST has appointed the Meraka Institute to manage the process of implementing SANReN and to act as the department's agent in all related operational and administrative matters.

#### Launch of the Meraka Institute

Deputy Minister Hanekom launched the Meraka Institute at the CSIR on 17 May 2005, World Telecommunications Day. Also known as the African Advanced Institute for Information and Communications Technology, the institute aims to contribute to government's programme to increase the scale and scope of R&D in the ICT area through focused, needs-driven research in key fields, such as human language technologies and high performance computing. It will focus on developing people



and on developing and applying knowledge in ICT.

These efforts will be closely aligned with initiatives and strategies such as the ICT Roadmap, the Advanced Manufacturing Technology Strategy and the Frontier Science programme. Working in close partnership with higher education institutions, the institute aims to create critical mass and concentrated national R&D efforts. The institute will also partner closely with international research and development players.

Meraka is a Sesotho word meaning "common grazing", which denotes sharing, mutual benefit and the potential for prosperity.

# The ICT Research and Development Strategy

The ICT Research and Development Strategy was finalised in 2005. It aims to make South Africa a vibrant, innovative, inclusive and accessible knowledge society. The strategy outlines a plan of action to create an enabling framework and an innovative environment for advancing ICT R&D and innovation. It was developed in partnership with academia, the science councils, industry, government and international experts. Flagship research programmes in geomatics, wireless and satellite communications, and ICT in education have already begun.

# **Contributions to energy**

### South African National Energy Research Institute

A joint initiative between DST and the Department of Minerals and Energy, SANERI was established in March 2005. A subsidiary of the Central Energy Fund, SANERI is responsible for facilitating skills development, and undertaking research and technology development, to ensure the optimal use of South Africa's energy resources. SANERI's focus areas include industrial and domestic energy efficiency, renewable energy sources, clean coal technologies, and meeting the basic energy needs of the poor – including clean cooking fuels and efficient cooking appliances.

DST has provided R20 million for the costs of setting up the research institute, which is based at the Central Energy Fund offices in Rosebank, Johannesburg. A portion of this funding will also be used for energy studies, bursaries to attract students to this important field of study and a novel R&D programme to strengthen human capital in energy. Funding for SANERI will increase to R40 million in 2006/07.

One way in which SANERI will build research capacity is through funding research at universities and in science councils. It has invited South African universities to bid for an initial three grants of R2 million each per year, for a three- to five-year period, to set up energy research chairs. The deadline for proposals was March 2006.

### Energy R&D strategy

A key component of the National Research and Development Strategy is the development of sector strategies. Energy is one of the priority sectors. In the review period, staff from DST's Expert Services programme and the Department of Minerals and Energy began the groundwork for developing an energy R&D strategy. The strategy document has highlighted key areas for research, including energy infrastructure optimisation, energy efficiency and demand-side management, secondary beneficiation of mineral resources, and the expanding socioeconomic and development opportunities within the informal economy. SANERI's newly established board and soon-to-be appointed CEO will move the strategy forward.

#### The biofuels initiative

Biofuels represent a potential source of clean and renewable energy, and excellent work is being done in exploring this area in partnership with the Department of Minerals and Energy. The principle is that organic matter can be converted directly into liquid fuels. The two most common biofuels are ethanol and biodiesel. Work has been completed on the technical standards for biodiesel, and tests have been conducted on six candidate crops: soya, sunflower, canola, groundnut, cotton and jatropha. At present, sunflower and soya are the most viable in South Africa.

The biofuels industry initiative, apart from reducing our reliance on fossil fuels, promises substantial job creation and new business development opportunities.

In October 2005, DST and the Department of Environmental Affairs and Tourism hosted South Africa's first National Conference on Climate Change. Most presentations touched on issues of climate change modelling; the predicted results of a changing climate; and what steps could be taken to reduce these effects. In his keynote address, Minister Mangena called for greater investment in the science of climate change and African R&D. He also identified alternatives to hydrocarbon-based fuels, including nuclear power, and wind and solar technologies.



national conference on climate change



# Programme 5: Government Sector Programmes and Coordination

Work on biofuels has been assigned a high priority as part of the Accelerated and Shared Growth Initiative – South Africa.

After discussions with Cabinet, which recognises the potential of the biofuels industry for job creation, it was decided that DST, the Department of Minerals and Energy and the Department of Agriculture would finalise a biofuels industrial strategy by October 2006.

### **Contributions to business**

# Advanced Manufacturing Technology Strategy

The Advanced Manufacturing Technology Strategy (AMTS) was presented to Cabinet in 2003 and, from a technology perspective, underpins the Integrated Manufacturing Strategy of the Department of Trade and Industry. The thrust of the strategy is to strengthen the competitiveness of the manufacturing sector through the implementation of targeted, high-impact research and experimental development projects. The governance framework for the AMTS locates the programme at the Manufacturing and Materials Technology Division of the CSIR.

AMTS flagship projects include:

Composite technologies: DST has had considerable success in securing industry support for implementing the AMTS in programmes that feed into the aerospace and automotive industries. Airbus's future A400M airlifter is a strategically important project for the South African aerospace industry. South Africa is aiming to develop competencies in A400M structural/airframe supply chain, design skills and electronics technologies. DST is planning to set up a Centre of Excellence in composite technologies in 2006, with a specific focus on repositioning the domestic aerospace industry in the A400M structural/airframe supply chain. The currently available AMTS funds are inadequate for establishing the R&D effort required for South Africa to fully exploit this opportunity.

**Cleaner production technologies:** Industrialised countries are under increasing pressure to adapt cleaner production technologies, particularly in relation to emissions. Of growing importance, and related to the Montreal Protocol to which South Africa is a signatory, is the replacement of ozone-depleting substances encountered in the air-cooling, air-conditioning and refrigeration industry sector. This also has implications for the mining sector. DST will establish a Centre of Excellence in the cleaner production technologies component of the AMTS.

### **Tshumisano Trust**

Established in 2002, Tshumisano's mandate is to provide support for the SMME sector through its technology stations programme (TSP). The technological expertise at the universities of technology provides support for skills and product development for SMMEs. At the same time, the institutions have the opportunity to engage directly with industry. The TSP aims to strengthen activities in technological innovation and skills upgrading to increase the competitiveness of SMMEs in targeted sectors, which include: automotive, food processing, electronics, metal value-adding, chemicals, metal casting, and composite and moulded plastic. There are 10 technology stations across the country.

During the year under review, DST established a technology station focusing on food-processing technologies at the Cape Peninsula University of Technology.

A focused internship programme in science and technology at the Tshumisano technology stations was also set up. With the link to the universities of technology, interns have a solid knowledge base to support them in their 6-12 month stints at small engineering companies. The universities of technology report that their former students taking part in the internship programme have more success in finding employment than those who try to get a job straight after graduating. Using the database on unemployed graduates that DST is building, the programme will take on more interns in 2006.

#### Tax incentives for R&D

Cabinet has decided that one of the key targets of the National Research and Development Strategy is that gross expenditure on research and development (GERD) must reach a level of I percent of gross domestic product by 2008/09. Reaching this target will demand both public and private-sector commitment to innovation. Current data show that GERD increased from 0.81 percent of GDP in 2003/04 to 0.87 percent of GDP in 2004/05.

As part of the work of the Economic Cluster of government departments, in 2005 DST took the lead in setting up an interdepartmental task team to promote private sector spending on R&D. This involved DST, National Treasury, the Department of Trade and Industry, and the Office of the Presidency. The task team's proposals became part of the cluster's Government Programme of Action for 2005.

DST also commissioned a study on tax incentives to inform the work of the task team. Different scenarios were examined using various types of incentives, and the projected effects of these instruments on the economy and the private sector were assessed. The study provided a convincing argument that the social and economic spillover benefits of R&D are larger than the private returns to companies performing R&D. These findings are backed up by empirical work done internationally.

Based on the study's findings, the task team recommended introducing an improvement to the tax allowance already provided to businesses. The Minister of Finance responded by increasing the existing 100 percent tax allowance treatment of R&D spending to 150 percent. He also introduced an improvement in the rate at which R&D capital expenditure can be depreciated.

#### Integrated government science and technology expenditure plan

In collaboration with the National Treasury, DST has structured a framework for reporting on science and technology expenditure across government. This framework includes a survey instrument with internationally benchmarked definitions. It will allow science and technology expenditure reporting by all departments to be integrated into Estimates of National Expenditure reports.

Under the new reporting framework, every government department has to analyse and report on its science and technology/R&D expenditure. A number of departments have already begun formal reporting along these lines. The reports will be consolidated to produce the first national science and technology expenditure



# Programme 5: Government Sector Programmes and Coordination

report for the 2006 medium-term expenditure framework. This detailed information will give DST the tools to analyse the nature of science and technology investment by government – and will help make departments aware of how they are contributing to modernising the economy.

In another area, DST collaborated with the science councils to produce the data specification for the proposed national R&D management information system. The data specification will be refined to enable an online database to be designed. harvest, value addition (beneficiation) technologies and that technical support services are very significant and offer great opportunities. We extend an invitation to the private sector to join hands with us and our partners in government to expand this industry through public-private partnerships targeting small, medium, and large-scale enterprises."

### **Technology for social impact**

#### **Aquaculture**

In December 2005, Deputy Minister Hanekom officially launched the Hands-on Aquaculture Project at a function in Franschhoek. This joint DST-University of Stellenbosch project is aimed at contributing to economic empowerment and social development of disadvantaged rural communities through aquaculture.

Aquaculture involves growing fish in a controlled environment. Existing irrigation dams are being used in the project. Through this project a viable trout fish farming business has been created. The trout are sold to a fish processor, which in turn processes and sells the products to the food service and retail sectors. A five-year uptake agreement has been signed with the processing company.

The project contributes to raising rural communities' income, nutritional standards and skills levels. In the reporting period, 13 small-scale farming units were established. Their first harvest yielded 51.4 tonnes of  $\pm 1 \text{ kg}$  trout, with an estimated gross farm-gate value of more than R1 million.

At the project launch, Deputy Minister Hanekom said: "DST recognises that the economic value for small and medium-scale enterprises rests largely in postIn August 2005, Deputy Minister Hanekom and the Premier of Limpopo, Sello Moloto, launched the Hi-Hanyile Mosquito repellent candle factory in Giyani, Limpopo. Hi-Hanyile is one of seven essential oils initiatives by DST and the CSIR. The factory has the capacity to manufacture 400 000 candles a year. Each 250-gram candle can burn for up to 55 hours and retails for about R20.



essential oils

### Vision for the year ahead

Government Sector Programmes and Coordination has a range of interventions in place in partnership with other government departments. As the sector R&D plans are finalised in biodiversity, defence, transport and other sectors, the challenge is to use the appropriate institutional instruments and R&D interventions to reach the desired development objectives. The year ahead will be more focused on outputs and directions for specific outcomes.



This factory merges indigenous knowledge with mainstream science. R&D by the CSIR in collaboration with traditional healers has extracted the active chemical component of the indigenous plant, [mosukutswane (Tswana); msuzwana (Zulu)] used by local communities to repel mosquitoes. Tests show that the active ingredient of the plant possesses higher mosquito-repelling efficacy than most commercial mosquito repellents.

The science involves the cultivation and extraction through steam distillation of aromatic oils from indigenous herbs, such as rose geranium, buchu and lippia javanica, which are sold on to the essential oils market.






The key public entities that report to the Minister of Science and Technology are listed below, along with brief reports on their performance during 2005/06. These entities produce their own annual reports.



## Council for Scientific and Industrial Research

The core R&D base of the Council for Scientific and Industrial Research (CSIR) consists of key competency areas covering biosciences; the built environment; defence, peace, safety and security; materials science and manufacturing; and natural resources and the environment. These areas draw together research fields and scientific disciplines assembled to align with the needs of specific government departments; primary, secondary and tertiary industry sectors; and society in key areas of socioeconomic impact. Each area takes into account strategic stakeholder requirements and focuses on managing a portfolio of science and technology competencies and research directions that contributes most meaningfully to the attainment of scientific objectives within the sectors addressed. R&D and its outcomes are handled as an integral part of the research and innovation value chain.

Over and above the core research areas, the CSIR houses facilities of strategic importance for African science, including the Meraka Institute (the African Advanced Institute for Information and Communications Technology), the National Laser Centre, the National Metrology Laboratory and the Satellite Applications Centre.

A brief overview of CSIR activities during the year under review is provided below.

#### **Biosciences**

## Mosquito repellent candle factory launched in Limpopo

CSIR researchers and traditional healers who collaborated in studies on indigenous plants with mosquito-repellent properties celebrated the discovery, in the mid-1990s, of a novel mosquito repellent that proved to be more effective than similar or comparable commercial products on the market.

In August 2005, this discovery resulted in another celebration, when Deputy Minister of Science and Technology Derek Hanekom officially launched a community-owned mosquito repellent candle factory in Limpopo, where this plant is being cultivated and distilled, and its essential oils used in the manufacturing of candles.

### Exploiting proteins to build molecular motors

CSIR researchers Dr Neeresh Rohitlall (Biosciences) and Dr Raymond Sparrow (National Laser Centre) are exploiting these protein characteristics to build nanomotors – molecular devices that convert energy into movement and forces in the order of picoNewtons.

## Enzymes put to work in the production of pectin from citrus waste

CSIR biochemists are collaborating with the University of KwaZulu-Natal in Durban, the Chemin incubator and Kat River Citrus Co-op Ltd to establish a pectin production plant that uses enzymes to produce pectins from citrus waste. There has recently been significant growth in the uses of LM pectin. LM pectin is used as thickening or gelling agents in a broad range of formulated foods such as yoghurt, milk desserts and jellies. The CSIR will apply its skills in process chemistry, biotechnology, chemical engineering and food science to develop the technology required for the extraction, hydrolysis, purification and formulation of LM pectin.

### The birth of the "safe egg"

Food safety coupled with rising consumer concerns inspired the establishment of an R&D consortium led by the CSIR. The consortium successfully developed a new system to pasteurise shell eggs, significantly reducing the risk of salmonella enteritidis, a disease-causing microorganism carried by infected chicks. Uncooked and semi-cooked eggs and products containing raw eggs – many types of desserts, mayonnaise and salad dressings – can contain the pathogen, resulting in salmonella poisoning.

### Partnership to develop "super sorghum" for Africa

The CSIR has joined forces with eight other globally respected organisations to develop more nutritious, easily digestible sorghum with increased levels of provitamin A and E, iron, zinc, essential amino acids and protein prototypes with increased lysine.

#### **Built environment**

#### Assessing the suitability of land for low-income housing

The CSIR has developed and applied a sustainable housing locality cost-benefit assessment model in eight subsidised housing locations (Alexandra and Diepsloot in Johannesburg, and six localities in eThekwini, KwaZulu-Natal).

The model has been developed to guide decision-makers to direct low-income housing delivery to localities that are least costly to develop, maintain and operate over the longer term, but which at the same time yield the greatest benefit.

#### Support for decision-making on housing investment

The CSIR has published the second Housing Atlas in a planned series, prepared in response to housing trends and changing policy direction. The Housing Atlas 2005 provides organised spatial information concerning factors, criteria and indices that affect decisions regarding the most suitable locations and priorities for housing investment in the country, in the prevailing delivery and policy context. Atlases are produced in both hard copy and electronic format, and can be obtained from www.housing.gov.za



### Planning functional community health centres

The CSIR, in cooperation with collaborative partners such as the US Centres for Disease Control and South Africa's Medical Research Council, is playing an important role in guiding and advising architects and engineers involved in the planning of healthcare facilities.

Defence, peace, safety and security

## Ongoing maritime area surveillance

South Africa and its surrounding maritime areas are continuously being threatened by activities such as illegal fishing, illegal immigration, smuggling and oil pollution, and in most cases these activities are difficult to observe.

AwareNet is a new programme with the objective to develop a science and technology capability that provides wide-area, real-time situational awareness to those agencies of the state tasked to ensure peace, safety and security in South African territory.

## South Africa designs and develops top cash-intransit vehicle

As the number of cash-in-transit heists in South Africa increases and the weapons and tactics that the perpetrators use become more sophisticated, security companies have been searching for vehicles designed to withstand the growing risks of transporting cash.

In response, the CSIR, Nissan Diesel SA and TFM Industries formed a consortium to design a new vehicle in conjunction with one of South Africa's leading cash-in-transit companies. Together they have created an armoured, modular, upgradeable, multipurpose vehicle for the local and international market.

## **MECORT** installed on CSIR Pretoria site

The world-class R45 million MECORT radar and electro-optical research facility was delivered to the CSIR in October 2005. It represents one of the

largest investments by the Department of Defence in CSIR research infrastructure. The system has been installed to provide a clear line of sight to the test target generator on the Telkom tower, as well as air traffic associated with the Waterkloof Air Force Base and some of the local commercial airports.

#### Natural resources and the environment

### Technology to predict and manage air quality

South Africa's population resides largely in urban areas, where the cumulative effects of increased vehicle use, population growth and industrialisation have led to poor air quality. The CSIR is leading a team consisting of the South African Weather Service, Cape Peninsula University of Technology and SRK Consulting. The team has designed computer-based technology that can predict concentrations of air pollution in the atmosphere.

## Working with communities to rehabilitate degraded catchments

Soil erosion poses a threat to water resources and land productivity. The land in rural Mnweni and Okhombe (in the Drakensberg foothills) is subjected to poor water infiltration, increased runoff and soil erosion due to loss of grass cover on the steep mountain slopes. A project funded by the Water Research Commission, involving the CSIR, the University of KwaZulu-Natal, the Farmer Support Group, the Department of Agriculture and KwaZulu-Natal Wildlife, is assisting these rural communities to control this erosion.

## Watching over Africa's carbon budget

International treaties are in place to control rising levels of carbon dioxide, a problem that has been on the global agenda for the past decade. There is also a rapidly growing market for "carbon credits" – a system in which countries that reduce emissions more than they need to sell their forests and soil space (carbon sinks) to those that exceed their targets for carbon storage. Global distribution of these "sinks" can be calculated in broad latitudinal bands using inverse modelling.

The CSIR manages two large projects connected to carbon budgets: the Ecosystem Processes and Dynamics Research Group, which provides high-quality measurements to narrow the sinks to small regions; and the three-year African Carbon Experiment (funded by NASA), now in its second year, which will feed into a European Union-funded project called AfriCarbon.

#### Information, communications and space

#### The Digital Doorway

The Digital Doorway, an initiative between DST and the Meraka Institute, uses minimally invasive education to promote large-scale computer literacy. During 2005, more than 100 terminals were installed in a mix of rural, peri-urban and urban areas. The Digital Doorway is cost-effective, requires low maintenance and makes remote management and administration possible through the use of open source software.

#### Centre for High Performance Computing

A Centre for High Performance Computing is currently being set up. The aim is to provide high-end computing and expertise for research, including natural science, medicine, engineering and social science.

### Cantenna connects rural home to the world

The Meraka Institute's first "Cantenna" (an antenna made from a metal can, such as a coffee tin, and a section of a bicycle spoke soldered into a special connector) was installed in a rural setting. It was mounted on the house of Agnes Mdluli, a health worker in Peebles Valley, near White River in Mpumalanga.

This technology has also enabled the local high school, which uses the more costly omni-direction antenna, to gain internet access through its computer centre. Community members will be trained to construct their own Cantennas, set up a wireless router and connect it to a computer.

#### Accessible telephony services now a reality with DialogPalette

DialogPalette, a user interface based on open source software developed by the Meraka Institute, is helping to make affordable and easy-to-use telephony-based systems a reality. It is part of the OpenPhone project, which aims to make telephonybased applications accessible to all South Africans.

#### Meraka releases text-to-speech systems in isiZulu and Afrikaans

The release by the Meraka Institute of software containing new voices accompanied



by the requisite software toolkit (in open source format) is a significant milestone in the development of text-to-speech voices in new languages, notably isiZulu and Afrikaans. Research is also being done on South African English, Setswana and Sesotho sa Leboa.

### Creating the Sensor Web alliance

A Sensor Web is a web-centric, open, interconnected, intelligent and dynamic network of sensors. This earth and space observation system consists of many interconnected sensors that can perform extensive monitoring to provide timely, comprehensive, continuous and multimode observations.

The Meraka Institute (ICT4EO Research Group), the University of Muenster (Institute for Geoinformatics), Mississippi State University (GeoResources Institute) and 52North have agreed in principle to establish a global research partnership for Sensor Web enablement.

#### Detecting fires from space

Unwanted and uncontrolled bush and grass fires are often disastrous for people, livestock and property. The only means of accurately determining the exact location and extent of a fire is by a global perspective from space. Recognising the benefits of earth observation information, the National Department of Agriculture made a multimillion-rand grant to the CSIR to procure a MODIS receiving and processing system. Kongsberg Spacetec in Norway was awarded the contract to upgrade the CSIR's Earth Observation Data Centre for MODIS and NOAA reception.

The current NOAA archive at the CSIR Satellite Applications Centre will enable the generation of a 17-year active fire record, which will provide valuable information on fire frequency, distribution and intensity.

## Forty years of excellence in satellite tracking

The 40-foot diameter (12.19 m) parabolic antenna of the CSIR Satellite Applications Centre at Hartebeesthoek

has, over a period of 40 years, rescued a \$400 million satellite, received data from scientific packages left on the moon by Apollo astronauts and tracked the BIOS capsule with a monkey on board.

## Launch support for first Ka-band satellite

When Boeing's Spaceway FI satellite was launched on 26 April 2005 in Long Beach, California, the CSIR had all systems in place to provide the launch support for the first commercial Ka-band telemetry, tracking and command satellite ever launched.

In terms of a contract awarded to the CSIR, its Satellite Applications Centre will support the launches of all three Spaceway satellites – F1, F2 and F3. The support services provided include telemetry (receiving the satellite's health status and data), tracking (tracking the satellite and sending Boeing the antenna pointing data and ranging data) and command (relaying commands from the Boeing control centre to the satellite).

#### Materials science and manufacturing

### Sensor technology reaches milestone

CSIR Materials Science and Manufacturing reached a milestone when the 100th unit of the CoroCam was sold. CoroCam is a range of imaging tools developed with Eskom for the power distribution industry that provides engineers with the ability to inspect distribution lines and their insulators for damage or deteriorating conditions that could lead to power outages. CoroCam cameras can simultaneously image visible as well as ultra-violet wavelengths to provide an analysis of an electrical installation's condition. Units have been sold worldwide, with many being used by universities and electrical utilities for research into insulator design and maintenance.

## New nano-drug delivery system targets TB sufferers

Tuberculosis (TB) is spreading. In 2001, the disease killed more people than in any previously recorded year. Globally, there is a 3 percent increase in new

TB cases each year, while in Africa the increase is 20 percent per year, largely due to co-infection with HIV/Aids. Every year, 8 million people worldwide develop active TB and 3 million die from the disease, while more than 400 000 new cases of multi-drug-resistant TB are diagnosed.

A new method TB-drug delivery using nanotechnology is being developed by the CSIR. The TB nano-drug delivery project seeks to address patient non compliance in TB control programmes through the development of a system in which drugs can be administered in a single dose that maintains an active level for a number of days or weeks.

### FabLab introduces concept of personal fabrication

South Africa's first FabLab, established by the DST under the auspices of its AMTS and managed and established by the CSIR, is based at the Innovation Hub in Pretoria.

The goal of the AMTS FabLab programme is to help people use advanced information technologies to develop products and solutions to address local needs. The FabLab is very different from other rapid product development facilities, with the focus on manufacturing of the total product. This includes design, fabrication, testing and debugging.

Working in close partnership with provincial and local government, NGOs and the private sector, there are plans to establish seven additional FabLabs around the country.

### Investigating alternative power resources

Fuel-cell technology as an alternative to traditional power sources has the potential to diversify the face of power supply in South Africa. The CSIR will significantly enhance its fuel-cell research capability with the acquisition of a custom-designed test system. Known as an Evaluator<sup>®</sup> C050, the test system is ideally designed for membrane electrode assembly (MEA) developers, fuel-cell researchers and stack developers performing single-cell testing. This technology not only promises cleaner, more efficient energy, but provides a unique combination of features and benefits. A current project of the CSIR explores the potential benefits offered by the unique properties of nanostructured materials to improve performance of MEAs and to reduce the amount of platinum used in fuel cells.

## Immobilising enzymes for better adaptability

Enzymes are preferred to normal chemical catalysts in many industries due to their high selectivity, activity and product yields. They also reduce waste products, effluent load and energy consumption (due to milder reaction conditions). However, the application of enzymes in industrial biocatalysis is hampered by their cost and difficulties in recycling.



The CSIR has developed a novel self-immobilised enzyme by using an emulsion to control size and orientation. Known as SphereZymesTM, these selfimmobilised enzyme spheres display high enzyme activity per unit volume of reaction. In some cases, activities in excess of 100 percent compared to the native enzymes can be achieved (whereas immobilisation through cross-linking usually leads to activities of less than 50 percent of the free enzyme activity). This is achieved by using a proprietary method during manufacture to immobilise the enzyme in its active state.

#### Solar cells: a solution to the energy crisis?

As fuel sources become depleted, there is an increasing search for alternative sources of energy, particularly solar energy, since it is clean, abundant and renewable. However, cost, performance and convenience need to be improved if solar energy is to be integrated successfully into society. A novel system to effect improvement is the use of dye-sensitised solar cells (DSC), in conjunction with several new concepts, such as nanotechnology and molecular devices.

The CSIR is working toward DSC niche applications, which include alternative energy devices to be used in cellphone chargers, laptops and radio batteries. Solar cells produced to date at the CSIR have successfully driven a toy windmill and a kitchen clock.

## Lasers used in cleaning and nuclear decontamination

Laser cleaning involves the laser evaporation of nonmetallic coatings from metallic substrates. A number of demonstrators involving this technology have been set up at a CSIR laboratory where the necessary nuclear safety services are available. However, for both industrial laser cleaning and nuclear decontamination, system mobility is a key issue.

The first locally developed transportable laser-based system intended for the removal of paint from walls in nuclear facilities, developed by the CSIR National Laser Centre, is nearing completion. Potential applications range from paint removal to cleaning of vulcanising moulds, removal of grease layers and de-scaling of weld seams.

For more information visit the CSIR website at www.csir.co.za



## Human Sciences Research Council

During 2005/06, the six research programmes and five cross-cutting research units of the Human Sciences Research Council (HSRC) were engaged in 248 research projects of a remarkable variety. These projects were supported by funds from many local and international sources, including Parliament.

Some R73.7 million of the parliamentary grant of R85.1 million for 2005/06 was directly allocated to research activities. Of this amount, approximately R41 million was spent on research projects, while some R32.7 million was applied to research capacity building and to infrastructure support within the research programmes. The remaining, relatively small, portion of the parliamentary grant is used for institutional costs required to maintain basic research infrastructure and to respond to the institution's responsibilities as a public entity.

The HSRC was involved in several projects commissioned by DST. A selection of these is described below.

A five-year longitudinal study by the Gender and Development research unit – a unit that cuts across different research disciplines – aims to assess the various aspects of women's advancement in science, engineering and technology. The project consists of various components, including an e-mail discussion forum, drawing up a gender equity policy and a gender conference. Another study by the same unit assesses the participation of women in industrial science, engineering and technology in South Africa. The aim is to determine factors contributing to, or inhibiting, women with a science, engineering or technology background working in the industry.

The Education, Science and Skills Development research programme assessed the usefulness of different types of out-of-school interventions. It evaluated the extent, nature, and cost of out-of-school mathematics, science and computer studies programmes that cater for secondary school learners and developed a database of programmes, projects, organisations, individuals and institutions that offered out-of-school programmes in mathematics, science and computer studies to learners at the Further Education and Training level.

Another study by the same programme on the role of parents in their children's science, engineering and technology career choices seeks to establish the extent to which parents contribute to children's participation and performance in mathematics and science education, and influence their children in choosing careers in science and technology.

A comprehensive project on technology transfer for poverty reduction entails conducting a comprehensive study for DST to evaluate and identify best practices in the use of technology that either directly improves the quality of life of the poor, or which enhances delivery to low-income households.

To contribute to our understanding of indigenous knowledge and its value as a resource to ensure sustainable livelihoods in South Africa, URED is conducting a study on the importance of indigenous knowledge in reducing poverty of rural agrarian households. The Sustainable Livelihoods Framework and Approach is used as a starting point for analysis of the use of local knowledge in five assets: social, human, natural, physical and financial. The study looks at how a group of agrarian households in a rural community understands indigenous knowledge and poverty, and how they make use of local knowledge to combat poverty, in particular food insecurity.

The Employment, Growth and Development Initiative (EGDI) conducted a study to identify policy measures to foster employment creation for unskilled and semiskilled para-professionals in the care sector. The study aims to redress high and growing levels of national unemployment. An additional objective is to utilise the research outcomes to leverage funding for further research in this area.

EGDI also did a study on innovation in the resource-based technology cluster, which attempts to further pursue DST's lateral migration thesis and to address the concern that developing countries have difficulty attracting foreign investment in R&D. The study aims to locate central policy implications of lateral migration. An additional research component involves examining strategies to promote innovation on the back of South Africa's resource-based industries.



The Centre for Science, Technology and Innovation Indicators (CeSTII), housed in the Knowledge Systems unit at the HSRC, was commissioned by DST to conduct the first official South African Innovation Survey, as part of the department's effort to establish a baseline set of science and technology indicators for monitoring, reporting on, and finetuning the national system of innovation. The South African Innovation Survey 2005 produced a set of internationally comparable data and indicators for providing insights into the patterns of innovation in the mining, manufacturing and services sectors in South Africa. The current survey is closely based on the fourth round of the European Community Innovation Survey. CeSTII has worked closely with the Organisation for Economic Cooperation and Development and Eurostat in this regard, and is now not only a component of official statistics but also recognised as official country data by the OECD.

CeSTII also conducts the annual National Survey of Research and Experimental Development, which measures inputs into R&D activities in the country and separately covers the business enterprise sector of large, medium and small enterprises. These include state-owned companies; all government departments with an R&D component (including government research institutes and museums); the eight science councils and the Africa Institute of South Africa; both private and public higher education institutions; and non-governmental and other organisations formally registered as not-for-profit institutions that conduct research.

The above two surveys complement one another. The aim is to build a national database of R&D and innovation data compliant with international practice for preparation of indicators and reports. South Africa can only be taken seriously in science and technology if we have regular and reliable survey based data on innovation and R&D to report on the development of the national system of innovation.

For more information visit the HSRC website at www.hsrc.ac.za



## Africa Institute of South Africa

During the year under review the Africa Institute of South Africa (AISA) pursued a number of outreach and African awareness initiatives, including a number of high-level seminars and conferences.

AISA participated as a member of the task team with representatives of the HSRC, and the departments of Science and Technology, and Education in organising an international conference on Human Resources for Knowledge Production in Cape Town in June 2005.

AISA, in collaboration with Codesria, was privileged to be able to host Professor Archie Mafeje as a Distinguished-Scholar-in-Residence from June 2005 for a 12-month period, during which time he was engaged in ongoing work on the compilation of a volume containing the main body of his academic output over the past 50 years.

AlSA organised and hosted (with support from Policy Network, a London-based international think-tank) a South African government-funded conference on Regional African Progressive Governance, in Johannesburg in July 2005. The conference, which was opened by President Mbeki, brought together some 300 delegates from South Africa, Africa and around the world, including government leaders, policy makers, academics and political organisations.

AISA was represented at the 8th Congress of the Organisation for Social Sciences Research in Eastern and Southern Africa, in November 2005, in Addis Ababa, Ethiopia.

AISA was also represented at the 11th General Assembly of Council for the Development of Social Science in Africa (Codesria), in December 2005, in Maputo, Mozambique.

In January 2005, AISA organised a briefing in Pretoria on behalf of the Embassy of the People's Republic of



China to mark the occasion of the Chinese government's launch of its first-ever comprehensive policy paper on Africa.

AISA contributed a presentation on its work at a National Conference on African Studies, which was hosted by the Department of Education in Pretoria in February 2006.

During March 2006, AISA reciprocated a visit by five of its researchers to Moscow during 2004 by hosting a delegation of Russian scholars from Moscow University's Institute of African Studies. The occasion of this visit was marked with a seminar at which both the Russian delegates and AISA researchers delivered papers.

Having earlier in the year facilitated and provided logistical support and personnel for consultations and research conducted by Ploughshares, a Canadian NGO, in Mozambique, Botswana and Namibia, AISA arranged a Ploughshares-funded conference in April 2005 on "The Responsibility to Protect: Southern African Perspectives."

Two African scholars were also brought to AISA on three-month contracts in the course of the year on AISA's Visiting Scholar Programme named in honour of Professor Mafeje. The Nigerian scholars, Professor Emmanuel Babatunde and Professor Adewale Aderemi, each delivered a well-attended seminar presentation based on their research at AISA.

As part of its international outreach programme AISA maintained and renewed the following MOU's with sister research organisations and universities:

- Council for the Development of Science in Africa in Senegal
- Institute of African Studies at Cairo University
- West African Institute, Independent Global Development Research and Studies
  Centre
- International Institute of Applied Cultural Research in Cameroon
- Africa Study Centre in Mbale, Uganda
- Ethiopian International Institute for Peace and Development
- Institute of African Studies at Moscow State University
- African Studies Institute in Mumbai, India.

AISA developed a comprehensive outreach strategy that involved the development of a strong partnership with the United Nations system in South Africa. Under Dr Eddy Maloka's leadership, AISA developed close working relations with the UN Development Programme as the coordinator of the UN System in South Africa. It also forged a strong relationship with the Pan-African Parliament and the New Partnership for Africa's Development. On the domestic front, AISA also developed ties with the Presidency, the Department of Foreign Affairs and the Parliamentary Committee on Foreign Affairs.

For more information visit the AISA website at www:ai.org.za

# ASSA

## The Academy of Science of South Africa

Internationally recognised science academies are similar in that they are self-perpetuating, with a meritbased membership; multidisciplinary; and independent. Linked together, they can mobilise scientific thinking, skills and knowledge across the world. The Academy of Science of South Africa (ASSAf) places a particular emphasis on excellence in the application of scientific thinking to the problems and challenges facing South African society. It draws its membership from all scientific disciplines. Parliament passed the Academy of Science of South Africa Act (67 of 2001), which came into operation on 15 May 2002. ASSAf is thus the official national Academy of Science of South Africa, recognised by government and representing South Africa in the international community of science academies, including the Network of African Science Academies.

ASSAf was selected as one of three African science academies to receive funding from the US National Academies for building its capacity to generate evidence-based advice for the government and the nation. Support has been granted for a five to sevenyear period. This has permitted ASSAf to expand its staff complement, and to adopt a strong and vigorous developmental agenda. The academy's other sources of funds were Parliament (through DST), members' subscriptions, ad hoc grants from two US foundations and two grants from the InterAcademy Panel – the international organisation of 95 national science academies.

ASSAf signed a contract with DST for various activities in connection with the "strategic management" of research journals published in South Africa. This included the enhancement and sustainable publication of the South African Journal of Science and the establishment of a new science magazine to showcase South African scientific achievements to a wide national audience – Quest-Science for South Africa. In the case of Quest, a public sector distribution plan has been agreed to with DST's Youth into Science programme, the South African Agency for Science and Technology Advancement, and the Department of Education's Dinaledi schools programme.

The third component of the project was a comprehensive study of the present and best-possible future role of research journals published in South Africa. The full report on this was released in March 2006. The report, entitled "A Strategic Approach to Research Publishing in South Africa," makes 10 strategic recommendations in the light of the outcomes of the investigations reported in its six chapters. The project has revealed that the majority of research journals published in South Africa appear infrequently, contain few articles and are poorly cited in world literature. The recommendations include provision for targeted and well-managed financial support for high-quality journals that are listed in international databases, complementing own-revenue from a mix of page charge subscriptions and advertising. An "open access", electronic approach to publishing is strongly espoused. To implement some of the recommendations, ASSAf is now setting up a committee on research publications in South Africa and a research publication office.

TWAS, the Academy of Sciences for the Developing World, is an international academy of science with individual fellows drawn mainly from developing countries, including South Africa. The TWAS/ASSAf Young Scientist Prize is now administered by ASSAf in South Africa for DST. Professor Vivian Alberts of Rand Afrikaans University received the award in 2005 in recognition of his research findings in the field of novel thin-film photovoltaic cells. The economic and socioeconomic value of his pioneering work is to the country is potentially immense.

For more information visit the ASSAf website at www.assaf.co.za



## **National Research Foundation**

## **Highlights**

The National Research Foundation (NRF) follows a seamless approach to developing human resource capacity through: the promotion of public science awareness (especially at a schools level) and provision of support for developing students; a critical mass of research expertise; and capacity in entrepreneurship, technological development, innovation and commercialisation.

## South African Agency for Science and Technology Advancement

The South African Agency for Science and Technology Advancement (SAASTA) builds the potential pool of human resources for R&D through three thrusts: science education, science awareness and science communication. Apart from numerous activities involving learners, educators and the public at large, SAASTA is also in the process of developing science awareness infrastructure (e.g. a Life Sciences Centre incorporating a reconstituted museum) and the Johannesburg Observatory.

## **Support for students**

- The amount spent on student support increased by more than R4 million to R91,2 million (2004/05: R86,6 million) which constitutes 33 percent of the RISA core grant spending on human resource development
- The total number of students supported through the core grant increased to 4 450 (2004/05: 4 419)
- The number of women students supported increased by 3 percent to 2 181 (2004/05:2 108) and now constitutes 49 percent of all students supported
- During 2005/06, 1 173 doctoral students were supported the highest number per year so far
- The number of black doctoral students increased by 10 percent to 511 and now constitutes 44 percent of the supported doctoral students.
- Black students funded through the Scarce Skills Fund of the Department of Labour increased to 312, constituting 69,4 percent of the total (the Department of Labour target of 85 percent was therefore not met)
- At master's level black students constitute 75 percent of the total supported
- Women students constitute 50 percent of the total, which is still 4 percent below the 54 percent target set by the Department of Labour.



Support for researchers/grant holders

- Some 1 617 (2004/05: 1 481) were supported an increase of 8 percent on the previous year
- The number of black grant holders increased by 18 percent to 473 (2004/05: 387), constituting 29 percent of all grantholders
- The number of women grant holders increased by 15 percent to 600 (2004/05: 508), constituting 37 percent of all grant holders
- There has been a 13 percent increase in average grant size to R91 500 (2004/05: R79 000) bringing it on par with the 2001/02 average grant size

Outputs	Focus area programmes	Development programmes	Total 2004/05	Total 2005/06
Peer-reviewed publications	3024	541	2335	3564
Books	105	5	143	110
Chapters in books	284	48	160	332
Published conference proceedings	536	306	990	842
Scientific output 2005/2006*				

- There has been a 5 percent increase in grant amounts claimed by grant holders (including Thuthuka) to R173 406 (2004/05: R163 890)
- Research funded by Research and Innovation Support Agency (RISA) through its Focus Areas resulted in the following scientific output by RISA stakeholders: (see above table).
- The Innovation Postdoctoral Fellowship Programme was launched and made 33 awards to the amount of R5 million.
- The approval of the strategic plan of the National Zoological Gardens allows for transforming them from a traditional zoological garden into a National Research Facility for research in terrestrial biodiversity and conservation.



With regard to science outreach and awareness activities the National Research Facilities collectively recorded the following:

- I 941 schools participated in respective outreach activities at HartRAO, HMO, iThemba LABS, SAIAB and SAEON, of which 872 were disadvantaged schools
- 328 092 learners participated in respective outreach activities at NZG and SAAO, most of which were disadvantaged schools
- 7 227 educators were reached through various programmes

Supporting objectives	Performance measures/outputs	Performance	
		2004/05*	2005/06
Facilitating knowledge production	Research reports	214	291
	Journal articles (ISI and other refereed)	108	119
	Full-length conference proceedings	170	165
	Chapters in books	5	19
	Books	8	9
	Publications with external co-authors	135	112
	Patents awarded	0	0

- · 20 community projects were run mainly in disadvantaged communities
- 757 942 visitors were received by the National Research Facilities.

The National Research Facilities collectively contributed to knowledge generation as follows: (see above table)

## Finances

The NRF had a total income of R994,4m (2004/05: R914,3 million), which represented 8,7 percent growth over the previous year. Government grants to the amount of R535,3m were supplemented by other income to the amount of R458,8m (2004/05: R500,6 million).

For more information visit the NRF website at www.nrf.ac.za

"...increase technology capacity and provide SMMEs with technology solutions"



## **Tshumisano Trust**

The key focus of the trust is to improve the competitiveness of SMMEs in areas of national priority that can enhance economic growth. The strategic intent is to establish a footprint in all the provinces and help SMMEs in key economic sectors such as automotive, tooling, chemicals, clothing and textiles, and agri-food processing.

The Technology Stations Programme focuses on R&D technology platforms to increase technology capacity through capital asset purchases, and to provide SMMEs with the requisite technology solutions to produce world-class products, processes and services. The envisaged outcome will be an appreciable increase in the number of high-quality SMMEs that can contribute to employment, wealth and skills creation.

During the year under review, the total number of technology stations increased from seven to 10. From an operational point of view, through direct intervention by the trust's programme management unit, there was an appreciable increase in the number of functional stations.

The increase in project and equipment funding has led to an improved focus in growing the number and quality of SMMEs assisted by the trust. During this financial year the total number assisted grew to 787 – an increase of 55 percent from the previous year.

This number is expected to grow in 2006/07 as the Tshumisano Trust expands its footprint into other provinces. The focus in the next financial year will be to set up the two Institutes of Advanced Tooling in Soshanguve and Stellenbosch, which will address a key skills shortage area. The two institutes are meant to provide training for a new generation of toolmakers and tool engineers, toolmaking solutions for SMMEs, and R&D outputs for the plastic and automotive industry.

For more information, visit the Tshumisano Trust website at www.tshumisano.co.za











## Department of Science and Technology Vote 31 Annual Financial Statements for the year ended 31 March 2006

Report of the Accounting Officer	92
Report of the Auditor-General	99
Report of the Audit Committee	101
Accounting Policies	102
Appropriation Statement	106
Notes to the Appropriation Statement	113
Statement of Financial Performance	115
Statement of Financial Position	116
Statement of Changes in Net Assets	117
Cash Flow Statement	118
Notes to the Annual Financial Statements	119
Disclosure Notes to the Annual Financial Statements	126
Annexures to the Annual Financial Statements	129



Report by the Accounting Officer to the Executive Authority and Parliament of the Republic of South Africa.

## I. General review of the state of financial affairs

The Department of Science and Technology (DST) seeks to realise the full potential of science and technology in social and economic development, through the development of human resources, research and innovation.

The recent governance framework for the state-owned part of South Africa's science and technology system gives DST the role of developing emerging areas of science and technology, as well as supporting sister government departments in more mature areas. This new framework and the change in approach to the publicly funded portion of South Africa's science and technology system have led to a number of concrete organisational and operational changes, and these are evident in the department's programmes.

### **Key programmes**

- Programme 1: Corporate Services and Governance
- Programme 2: Science and Technology Expert Services
- Programme 3: International Cooperation and Resources
- Programme 4: Frontier Science and Technology
- Programme 5: Government Sectoral Programmes and Coordination

#### **Expenditure trends**

Since its establishment, the department has consistently spent more than 90% of its budget. The 2005/06 financial year was no exception, with spending of 99,84% of the approved budget of R2,042 billion bolstering its excellent historical performance. Expenditure on transfer payments increased from R1,149 billion in 2004/05 to R1,865 billion in 2005/06. The table below gives a summary of the expenditure by budget reconciliation as well as the economic classification.

Budget reconciliation	
	2005/2006
	R'000
Amount voted	2 041 936
Actual expenditure	2 038 753
Surplus	3 183

#### **Economic classification**

	2005/2006
	R'000
Current expenditure	170 978
Transfer payments	I 865 085
Payments for capital assets	2 690
Total	2 038 753

92

Spending on transfer payments (91%) dominated the department's Vote.

## 2. Services rendered by the department

The department does not provide any services to any institutions or persons on a recoverable basis.

## 3. Appointment of the new Director-General

From I March 2006, the Director-General, Dr RM Adam, who contributed immensely to the establishment, formation and shaping of DST, was deployed by Cabinet to head the Nuclear Energy Corporation of South Africa. Ms M Pyoos, the Deputy Director-General of Programme 5, was appointed acting Director-General for one month, from I March 2006 to 31 March 2006.

The process of recruiting the new Director-General was relatively quick. Thanks to the efficient recruitment mechanism put in place by Human Resources and the Minister's assistance, the department was able to fast-track the appointment of the new Director-General, Dr P Mjwara. Dr Mjwara is no stranger to the national system of innovation, having worked for DST before joining the CSIR, from where DST eventually recruited him. As a physicist, he has already made significant contributions to the South African science system, especially in the area of laser technology and research.

## 4. Public entities

The department funded the public entities listed below during 2005/06 (the amounts appropriated to them are included).

## Council for Scientific and Industrial Research (R431,6 million)

The Council for Scientific and Industrial Research

(CSIR) is governed by the Scientific Research Council Act (1988), as amended. Its mandate is to foster industrial and scientific development – either by itself on in partnership with public and private sector institutions – aimed at improving the quality of life of South Africans. In accordance with legislation, this is done in the national interest through directed and multidisciplinary research and technological innovation.

## Human Sciences Research Council (R104,3 million)

The Human Sciences Research Council (HSRC) supports development in South Africa and Africa by conducting applied social science research projects and coordinating research in terms of the Human Sciences Research Act (23 of 1968). The HSRC has aligned its research structures and activities to major development priorities, with focal areas covering: technology and education; democracy and governance; integrated rural and regional development; and the social aspects of HIV and Aids, and health. The HSRC has made significant contributions to the debate on the impact of public sector programmes on poverty, playing a leading role in research for The Presidency's review of the last 10 years of democracy, as well as other important national research programmes.

## National Research Foundation (R516,9 million)

As the government's national agency responsible for promoting and supporting research, the National Research Foundation (NRF), established in terms of the National Research Foundation Act (23 of 1998), aims to uphold excellence in its investments in knowledge, people, and infrastructure. The NRF's task is to advance research in all fields of the humanities, the social and natural sciences, engineering, and technology. The NRF has successfully addressed many of its research and development strategy imperatives since its establishment, which include science awareness and outreach, student support, scarce skills development and the creation of centres of excellence.

## Africa Institute of South Africa (RI9 million)

The Africa Institute of South Africa (AISA) is a statutory body that carries out in-depth analysis of Africa's current affairs and gathers intelligence on the future of Africa, the African Union (AU) and the New Partnership for Africa's Development (NEPAD). It focuses primarily on political, socioeconomic, international and development issues in contemporary Africa, and contributes to the goals of the national system of innovation because its research programmes have an impact on knowledge generation and human resource development.

## **Godisa Trust (R24 million)**

Godisa is a Tswana word meaning growth through nurturing. The trust's initiatives are co-financed with funding streams from DST, the Department of Trade and Industry and the European Union. Godisa's development programme supports new SMMEs (up to three years old) in achieving a competitive market position. By enhancing the competitiveness, productivity and sustainability of SMMEs, Godisa aims to promote long-term employment, economic growth and sustainable development. In June 2004, the Godisa Trust was listed as a public entity by National Treasury.

### Tshumisano Trust (R39,3 million)

The department has identified technological innovation and related skills upgrading as being of vital importance to the competitiveness of South African SMMEs. Tshumisano operates the technology stations programme with funding from the Department and Geselschaft für Techniesche Zussamenarbeit (GTZ). Technology stations are developed at technikons to service SMMEs, and also aim to improve market responsiveness to technikon programmes.

## Academy of Science of South Africa (R2,5 million)

The Academy of Science of South Africa Act (67 of 2001) provides for the establishment of the Academy of Science of South Africa (ASSAf). Its objectives are: to promote common ground for scientific thinking across all disciplines; to encourage and promote innovative and independent scientific thinking; to promote the optimal development of the intellectual capacity of all people; and to link South Africa with scientific communities at the highest levels, in particular in Africa. The academy publishes scientific reports, investigates matters of public interest concerning science, and manages South African research journals.

## South African National Energy Research Institute (R20 million)

The establishment of the South African National Energy Research Institute (SANERI) is a joint mandate with the Department of Minerals and Energy. SANERI's main focus is to build research capacity through funding research at universities and in science councils. In June 2004, Cabinet approved the governance model for SANERI as a subsidiary of CEF (Pty) Ltd.

## 5. Other organisations to which transfer payments were made

DST supports and promotes projects that aim to promote science and technology as well as addressing "market failure" in the national system of innovation. The department makes ad hoc transfer payments to institutions, boards, communities or other public bodies. Various programme managers in their respective units evaluate project proposals received from different role players and enter into an agreement with the parties by signing a memorandum of agreement once the decision has been made to fund a particular project.

The following are programmes and organisations funded by the department during the reporting period. The exact purpose of the funding is explained in detail in the section of the programme that it falls under.

## Programme I: Corporate Services and Governance

Transfer	Amount
	R'000
Technology Top 100	2 280
Total	2 280

## Programme 2: Science and Technology Expert Services

Transfer	Amount
	R'000
Institution and Programme Support	3 637
Total	3 637

## Programme 3: International Cooperation and Resources

Transfer	Amount
	R'000
Global Science	26 226
Total	26 226

## Programme 4: Frontier Science and Technology

Transfer	Amount
	R'000
Council for Scientific and Industrial Research	431 649
National Laser Centre	18 000
Biotechnology Strategy	154 850
Innovation Fund	101 597
Indigenous Knowledge Systems	3 500
Human Resource Development	12 600
Square Kilometre Array	8 000
Frontier Science and Technology	61 666
Science and Youth	16 581
Science Themes	25 964
Centres for Excellence	20 000
Equipment Placement	11 000
Total	865 407

#### **Programme 5: Government Sector Programmes and Coordination**

Transfer	Amount
	R'000
Technology Planning and Diffusion	17 028
Learnerships	5 000
Advanced Manufacturing Technology Strategy	41 515
Public Assets	43 000
South African Aids Vaccine Initiative	20 000
Information Communication Technology	14 023
Natural Resources	20 080
Flouro-Chemicals	20 000
Technology for Poverty Alleviation	12 900
Technology for Sustainable Livelihoods	46 999
Total	240 545

## 6. Corporate governance arrangements

## Resolution of the past financial yearmatter of emphasis

The department's matter of emphasis for 2004/05 was about the post-retirement medical benefit liability pertaining to some of the science institutions. This matter of emphasis was extraordinary because the Accounting Officer had no control over it. The good thing is that this issue was brought to both the attention of National Treasury and the Auditor-General.

#### **Risk management/fraud prevention policy**

Internal auditors SizweNtsaluba, VSP carried out a risk assessment during 2003/04. Top Management (Exco) took on the responsibility of managing the risks and during 2005/06, determined that the risks for the department were generally contained, as there were no major programme changes. The internal audit plan was therefore developed based on the risks assessed and the internal audit was executed accordingly. A policy on whistle-blowing was approved by the Audit Committee and has now been implemented. Like

all government institutions, DST has transferred its whistle blowing activities/ fraud hotline to the Public Service Commission (PSC).

#### Materiality framework and significance

Although this document is prescribed by both the Public Finance ManagementAct (I of 1999) (PFMA) and the Treasury regulations for public entities only, the department decided to adopt this document on the basis of good business practice. The Audit Committee supported the department by approving this important document and it is now in operation.

## Management process to minimise conflict of interest

The following are the measures that are put in place to reduce conflict of interest:

- On appointment, all senior managers (SMS members) are required to complete a disclosure of information form
- The same members are required to declare their financial interest in terms of partnerships and directorships on an annual basis

iii) All members of the departmental tender committee and the evaluation team are required to complete a declaration of interest form before the evaluation or awarding of a tender.

#### **Audit Committee**

In order to comply with the PFMA and the Treasury regulations, the department established an Audit Committee, which meets at least four times a year. The chairperson of the committee is Mr S Kajee, a director at KPMG. Other members of the committee are:

Member	Institution	Position
Dr RM Adam	Department of Science and Technology	Director-General
Prof D Fourie	University of Pretoria: Public Admin	Professor
Mr M Gantsho	Gaming for Future	Executive Chairperson
Dr JM Stewart	JM Stewart Consulting	Director

## Compliance with Section 63(2) of the **PFMA**

In terms of the above section, the Minister is obliged to oversee public entities reporting to the department. A subprogramme within Programme I: Governance and Institutional Support, is responsible for monitoring and ensuring that all public entities reporting to the department comply with the PFMA and apply best practice in corporate governance. Governance of the public institutions is carried out through certain benchmarking tools such as key performance indicators in line with the balanced scorecard. The Finance subprogramme ensures that other financial, PFMA and Treasury regulations issues related to compliance are adhered to.

## 7. Progress with financial management improvements

The department has given highest priority to the implementation of the PFMA and Treasury regulations in terms of Sections 76 and 77 of the act. Delegations in this respect are revised yearly and implemented.

Accurate financial reporting as required by the PFMA was submitted on time to relevant stakeholders. In addition to statutory requirements, the department has an effective in-house reporting and cash flow management system. The small savings accrued in the current financial year attest to the continual improvement in financial management.

## 8. Internal performance systems

The department has implemented the following accountability frameworks in order to monitor progress and achieve the desired targets:

The Operations Committee (Opco) meets every fortnight to discuss operational projects, and it in turn reports to Exco. This committee is made up of the deputy- directors general, the CFO and other members of DST invited by their respective managers. The Exco is chaired by the accounting officer on a fortnightly basis and strategic and governance issues are discussed. Monthly budget meetings are also held by the CFO, the management accountant and the programme managers of the respective programmes and their staff to discuss each programme's performance.

## 9. Reports after reporting date

#### The new building

After the close of the reporting period, the DST moved from its old premises at 188 Schoeman Street to a new building on the CSIR campus. This marks

a significant step for the DST for two main reasons: first, employees within the various programmes will eventually be able to interact in a non-restricted manner; and second, the department will be closer to other science institutions, contributing to the formation of a formidable science precinct in the country.

### The research and development system

The department has managed to arrange with National Treasury to include, separately, the rand value of the public sector's research and development activities in the Estimates of National Expenditure. This is the first step in the department's effort to establish a national science and technology expenditure plan as envisaged in the White Paper on Science and Technology. To complete this process, a Research and Development Management Information System that will capture data and report on research inputs, outputs, and processes of the research institutions will be put in place during 2006/07.

## 10. Other activities

#### **Performance audit**

The performance audit of DST programmes, which was commissioned by the department in 2003/04,

has been completed. The reports were discussed at the special audit committee meeting and the recommendations of both the internal audit and the Audit Committee were noted by the department. Plans and measures will be put in place to monitor the effective deployment of funds within the abovementioned programmes.

To achieve a holistic review of the science institutions reporting to the department, we are going to synchronise the performance audit and the institutional reviews. The reason for the synchronisation is that while the performance audit will give us a good measure of value for money, the institutional reviews will give us an indication of whether we are on the right track.

## II. Approval

The annual financial statements set out on pages 102 through 138 have been approved by me.



Marjorie Pyoos Acting Accounting Officer REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE FINANCIAL STATEMENTS OF VOTE 31 DEPARTMENT OF SCIENCE AND TECHNOLOGY FOR THE YEAR ENDED 31 MARCH 2006

## I. AUDIT ASSIGNMENT

The financial statements as set out on pages 102 to 138, for the year ended 31 March 2006, have been audited in terms of section 188 of the Constitution of the Republic of South Africa, 1996, read with sections 4 and 20 of the Public Audit Act, 2004 (Act No. 25 of 2004) and section 40 (1) (c) (i) of the Public Finance Management Act, 1999 (Act No 1 of 1999) (PFMA). These financial statements are the responsibility of the accounting officer. My responsibility is to express an opinion on these financial statements, based on the audit.

## 2. SCOPE

The audit was conducted in accordance with the International Standards on Auditing read with General Notice 544 of 2006, issued in Government Gazette no. 28723 of 10 April 2006 and General Notice 808 of 2006, issued in Government Gazette no. 28954 of 23 June 2006. Those standards require that I plan and perform the audit to obtain reasonable assurance that the financial statements are free of material misstatement.

An audit includes:

- examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements.
- assessing the accounting principles used and significant estimates made by management
- evaluating the overall financial statement presentation.

I believe that the audit provides a reasonable basis for my opinion.

## 3. BASIS OF ACCOUNTING

The department's policy is to prepare financial statements on the modified cash basis of accounting determined by the National Treasury, as described in note I to the financial statements.

## 4. AUDIT OPINION

In my opinion, except for the effect on the financial statements of the matter referred to in paragraph 5, the financial statements present fairly, in all material respects, the financial position of the Department of Science and Technology at 31 March 2006 and the results of its operations and its cash flows for the year then ended, in accordance with the modified cash basis of accounting determined by the National Treasury of South Africa, as described in note 1 to the financial statements, and in the manner required by PFMA.

## 5. EMPHASIS OF MATTER

Without qualifying the audit opinion, attention is drawn to the following matters:

### 5.1 Fixed assets

Section 38(1)(d) of the PFMA states that the accounting authority is responsible for the managing and safeguarding of assets. The following weaknesses were identified for:

 The fixed asset register of the Department was lost due to a system failure and no backup was maintained. A fixed asset register was obtained from the external party responsible for the maintenance thereof; and

There are a total of 1081 missing asset numbers in the sequential number order on the fixed asset register, the completeness of the fixed asset register could thus not be determined.

## 5.2 Performance information

National Treasury Preparation Guide of the Annual report requires performance information to be submitted for audit purposes at the latest on 15 June 2006. The performance information was only submitted on 3 July 2006.

## 6. APPRECIATION

The assistance rendered by the staff of the Department of Science and Technology during the audit is sincerely appreciated.



AH Muller for Auditor-General Pretoria 26 July 2006



We are pleased to present our report for the financial year ended 31 March 2006.

## Audit Committee members and attendance

The Audit Committee consists of the members listed hereunder and meets at least two times per annum in terms of its approved terms of reference. During the current year six meetings were held (four ordinary and two extra-ordinary).

Name of member	Number of meetings attended
Mr SAH Kajee (Chairperson)	6
Dr RM Adam (Accounting Officer)	4
Marjorie Pyoos (Acting as DG/Accounting Officer)	I
Peter Pedlar (Acting as DG/Accounting Officer)	I
Dr JM Stewart	6
Mr M Gantsho	6
Prof D Fourie	4

## Audit Committee responsibility

The Audit Committee reports that it has complied with its responsibilities arising from section 38 (1)(a) of the PFMA and Treasury Regulation 3.1.13. The Audit Committee also reports that it has adopted appropriate formal terms of reference according to its Audit Committee Charter, and has regulated its affairs in compliance with the charter and discharged all its responsibilities as contained therein.

## The effectiveness of internal control

The reports of the Auditor-General, read together with the management letter, as well as the reports of the internal audit function, have identified certain internal control deficiencies. This committee will monitor management's efforts to rectify these. However, the committee is satisfied that systems of internal control over the major financial risks are effective.

## The quality of in-year management and monthly reports submitted in terms of the act

The committee has noted the content and quality of quarterly internal audit reports prepared and issued by the Accounting Officer and the department during the year under review.

## **Evaluation of financial statements**

The Audit Committee has:

- reviewed the audited annual financial statements to be included in the annual report
- reviewed the Auditor-General's management letter and management response
- reviewed the report of the Auditor-General.

The Audit Committee concurs and accepts the conclusions of the Auditor-General on the annual financial statements and is of the opinion that the audited annual financial statements be accepted and read together with the report of the Auditor-General.

## Dr JM Stewart Chairperson of the Audit Committee

26 July 2006

The Annual Financial Statements have been prepared in accordance with the following policies, which have been applied consistently in all material aspects, unless otherwise indicated. However, where appropriate and meaningful, additional information has been disclosed to enhance the usefulness of the annual financial statements and to comply with the statutory requirements of the Public Finance Management Act, (1 of 1999) (as amended by Act 29 of 1999) (PFMA), the Treasury regulations issued in terms of the PFMA and the Division of Revenue Act, (1 of 2005).

## I. Presentation of the annual financial statements

## I.I Basis of preparation

The Annual Financial Statements have been prepared on a modified cash basis of accounting, except where stated otherwise. The modified cash basis constitutes the cash basis of accounting supplemented with additional disclosure items. Under the cash basis of accounting, transactions and other events are recognised when cash is received or paid.

## 2. Presentation currency

All amounts have been presented in the currency of the South African rand (R), which is also the functional currency of the department.

#### 2.1 Rounding

Unless otherwise stated, all financial figures have been rounded to the nearest one thousand rand (R'000).

### 2.2 Comparative figures

Prior period comparative information has been presented in the current year's financial statements. Where necessary, figures included in the prior period financial statements have been reclassified to ensure that the format in which the information is presented is consistent with the format of the current year's financial statements.

A comparison between actual and budgeted amounts per major classification of expenditure is included in the appropriation statement.

## 3. Revenue

### 3.1 Appropriated funds

Appropriated funds are recognised in the financial records on the date the appropriation becomes effective. Adjustments to the appropriated funds made in terms of the adjustments budget process are recognised in the financial records on the date the adjustments become effective.

Total appropriated funds received during the year are presented in the statement of financial performance.

Unexpended appropriated funds are surrendered to the National Revenue Fund, unless approval has been given by National Treasury to roll over the funds to the subsequent financial year. Amounts owing to the National Revenue Fund at the end of the financial year are recognised in the statement of financial position.

#### 3.2 Departmental revenue

All departmental revenue is paid into the National Revenue Fund when received, unless otherwise stated. Amounts owing to the National Revenue Fund at the end of the financial year are recognised in the statement of financial position.

## 3.2.1 Sales of goods and services other than capital assets

The proceeds received from the sale of goods and/or the provision of services are recognised in the statement of financial performance when the cash is received.

## 3.2.2 Financial transactions in assets and liabilities

Repayments of loans and advances previously extended to employees and public corporations for policy purposes are recognised as revenue in the statement of financial performance on receipt of the funds. Amounts receivable at the reporting date are disclosed as part of the disclosure notes to the annual financial statements.

Cheques issued in previous accounting periods that expire before being banked are recognised as revenue in the statement of financial performance when the cheque becomes stale. When the cheque is reissued the payment is made from revenue.

#### 3.3 Local and foreign aid assistance

Local and foreign aid assistance is recognised in the financial records when the department directly receives the cash from the donor(s). The total cash amounts received during the year are reflected in the statement of financial performance as revenue.

All in-kind local and foreign aid assistance are disclosed at fair value in the annexures to the annual financial statements.

The cash payments made during the year relating to local and foreign aid assistance projects are recognised as expenditure in the statement of financial performance. A receivable is recognised in the statement of financial position to the value amounts expensed prior to the receipt of the funds.

A payable is raised in the statement of financial position where amounts have been inappropriately expensed using local and foreign aid assistance; unutilised amounts are recognised in the statement of financial position.

## Expenditure

4.

#### 4.1 Compensation of employees

Salaries and wages comprise payments to employees. Salaries and wages are recognised as an expense in the statement of financial performance when the final authorisation for payment is effected on the system (by no later than 31 March of each year).The expenditure is classified as capital where the employees were involved, on a full time basis, on capital projects during the financial year. Capitalised compensation forms part of one or all of the expenditure for capital assets categories in the statement of financial performance.

All other payments are classified as current expense.

Social contributions include the entities' contribution to social insurance schemes paid on behalf of the employee. Social contributions are recognised as an expense in the statement of financial performance when the final authorisation for payment is effected on the system.

#### 4.1.1 Short-term employee benefits

Short-term employee benefits comprise leave entitlements, thirteenth cheques and performance bonuses. The cost of short-term employee benefits is expensed as salaries and wages in the statement of financial performance when the final authorisation for payment is effected on the system (by no later than 31 March of each year).

Short-term employee benefits that give rise to a present legal or constructive obligation are disclosed in the notes to the financial statements. These amounts are not recognised in the statement of financial performance.

#### 4.1.2 Long-term employee benefits

#### 4.1.2.1 Termination benefits

Termination benefits such as severance packages are recognised as an expense in the statement of financial performance as a transfer when the final authorisation for payment is effected on the system (by no later than 31 March of each year).

#### 4.1.2.2 Post-employment retirement benefits

The department provides medical benefits for certain of its employees. Employer contributions to the medical funds are expensed when the final authorisation for payment to the fund is effected on the system (by no later than 31 March of each year).

#### 4.2 Goods and services

Payments made for goods and/or services are recognised as an expense in the statement of financial performance when the final authorisation for payment is effected on the system (by no later than 3 I March of each year). The expense is classified as capital if the goods and services were used on a capital project.

## 4.3 Financial transactions in assets and liabilities

Debts are written off when identified as irrecoverable. Debts written off are limited to the amount of savings and/or under spending of appropriated funds. The write-off occurs at year-end or when funds are available. No provision is made for irrecoverable amounts.

All other losses are recognised when authorisation has been granted for the recognition thereof.

### 4.4 Transfers and subsidies

Transfers and subsidies are recognised as an expense when the final authorisation for payment is effected on the system (by no later than 31 March of each year).

#### 4.5 Expenditure for capital assets

Payments made for capital assets are recognised as an expense in the statement of financial performance when the final authorisation for payment is effected on the system (by no later than 31 March of each year).

## 5. Assets

#### 5.1 Cash and cash equivalents

Cash and cash equivalents are carried in the statement of financial position at cost.

For the purposes of the cash flow statement, cash and cash equivalents comprise cash on hand, deposits held, other short-term highly liquid investments and bank overdrafts.

#### 5.2 Prepayments and advances

Amounts prepaid or advanced are recognised in the statement of financial position when the payments are made.

#### 5.3 Receivables

Receivables included in the statement of financial position arise from cash payments that are recoverable from another party, when the payments are made.

Revenue receivable not yet collected is included in the disclosure notes. Amounts that are potentially irrecoverable are disclosed as part of the disclosure notes to the annual financial statements.

## 5.4 Investments

Capitalised investments are shown at cost in the statement of financial position. Any cash flows such as dividends received or proceeds from the sale of the investment are recognised in the statement of financial performance. Any impairment is disclosed as part of the disclosure notes to the annual financial statements.

## 6. Liabilities

#### 6.1 Payables

Recognised payables mainly comprise of amounts owing to other governmental entities. These payables are recognised at their nominal amounts in the statement of financial position.

### 6.2 Lease commitments

Lease commitments represent amounts owing from the reporting date to the end of the lease contract. These commitments are not recognised in the statement of financial position as a liability or as expenditure in the statement of financial performance, but they are disclosed as part of the disclosure notes.

Operating and finance lease commitments are expensed when the payments are made. Assets acquired in terms of finance lease agreements are disclosed as part of the annexures to the annual financial statements.

## 6.3 Accruals

Accruals represent goods/services that have been received, but no invoice has been received from the supplier at the reporting date, or an invoice has been received but final authorisation for payment has not been effected on the system.

Accruals are not recognised in the statement of financial position as a liability or as expenditure in the statement of financial performance, but they are disclosed as part of the disclosure notes.

#### 6.4 Contingent liabilities

A contingent liability 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 wholly within the control of the department; or

A contingent liability is a present obligation that arises from past events but is not recognised because:

 it is not probable that an outflow of resources embodying economic benefits or service potential will be required to settle the obligation; or the amount of the obligation cannot be measured with sufficient reliability.

Contingent liabilities are disclosed as part of the disclosure notes to the annual financial statements.

### 6.5 Commitments

Commitments represent goods/services that have been approved and/or contracted, but no delivery has taken place at the reporting date.

Commitments are not recognised in the statement of financial position as a liability or as expenditure in the statement of financial performance, but are however disclosed as part of the disclosure notes.

## 7. Net assets

#### 7.1 Recoverable revenue

Amounts are recognised as recoverable revenue when a payment made and recognised in a previous financial year becomes recoverable from a debtor.

### 8. Related party transactions

Related parties are parties that control or significantly influence the department in making financial and operating decisions. Specific information about related party transactions is disclosed as part of the disclosure notes to the annual financial statements.

## 9. Key management personnel

Key management personnel are those persons having the authority and responsibility for planning, directing and controlling the activities of the department. Senior management includes the Minister and Deputy Ministers responsible for the department, the Director-General, the Deputy Director-General(s), the Chief Financial Officer and any key advisors.

Compensation paid to key management personnel including their family members where relevant, is disclosed as part of the disclosure notes to the annual financial statements.

## Appropriation Statement for the year ended 31 March 2006

Appropriation per programme										
					2005/06				2004/05	
		Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure
		R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
١.	Corporate Services and Governance									
	Current payment	69,847	(1,817)	25,000	93,030	92,664	366	99.6%	64,276	59,215
	Transfers and subsidies	1,432	578	930	2,940	2,930	10	99.7%	145	122
	Payment for capital assets	300	1,239	-	1,539	1,528	11	99.3%	931	5,967
2.	Science and Technology Expert Services									
	Current payment	33,922	(2,421)	-	31,501	29,831	1,670	94.7%	22,782	22,786
	Transfers and subsidies	4,161	2,119	-	6,280	6,271	9	99.9%	8,981	8,972
	Payment for capital assets	200	302	-	502	499	3	99.4%	306	306
3.	International Cooperation and Resources									
	Current payment	35,901	1,406	(5,400)	31,907	31,777	130	99.6%	24,272	23,489
	Transfers and subsidies	47,134	(1,739)	-	45,395	45,395	-	100.0%	22,765	22,697
	Payment for capital assets	130	333	-	463	463	-	100.0%	150	985
4.	Frontier Science and Technology									
	Current payment	8,693	(1,618)	200	7,275	6,874	401	94.5%	2,803	2,801
	Transfers and subsidies	1,375,892	1,514	4,970	1,382,376	1,382,368	8	100.0%	814,004	814,004
	Payment for capital assets	-	104	-	104	104	-	100.0%	288	288
5.	Government Sectoral Programmes and Coordination									
	Current payment	13,274	(1,529)	(1,354)	10,391	9,832	559	94.6%	15,740	16,522
	Transfers and subsidies	450,875	1,599	(24,346)	428,128	428,122	6	100.0%	304,734	303,327
	Payment for capital assets	175	(70)	-	105	95	10	90.5%	235	743
	Subtotal	2,041,936	-	-	2,041,936	2,038,753	3,183	<b>99.8</b> %	1,282,412	1,282,224
	Statutory Appropriation									
	Current payment									
	Transfers and subsidies									
	Payment for capital assets									
	Reconciliation with Statement of Financial			-	2,041,936	2,038,753	3,183	99.8%	1,282,412	1,282,224
	Add:									
	Prior year unauthorised expenditure approved with funding									
	Departmental revenue received				229				302	
	Local and foreign aid assistance received				32				4,515	
	Actual amounts per Statements of Financial Performance (Total revenue)				2,042,197				1,287,229	
	Add:									
	Local and foreign aid assistance					-				4,760
	Prior year unauthorised expenditure approved					-				-
	Prior year fruitless and wasteful expenditure authorised					-				-
	Actual amounts per Statements of Financial Performance (Total expenditure)					2,038,753				1,286,984
# Appropriation Statement for the year ended 31 March 2006

Appropriation per economic classification									
				2005	5/06			2004	/05
	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
Current payment									
Compensation of employees	80,196	(14,965))	-	65,23 I	65,125	106	99.8%	58,264	58,204
Goods and services	81,441	8,957	18,446	108,844	105,824	3,020	97.2%	71,609	66,401
Interest and rent on land	-	-	-	-	-	-	0.0%	-	-
Financial transactions in assets and liabilities	-	29	-	29	29	-	100.0%	-	208
Transfers and subsidies									
Provinces and municipalities	229	(9)	-	220	193	27	87.7%	6,782	6,732
Departmental agencies and accounts	846,771	(37,577)	-	809,194	809,189	5	100.0%	732,153	730,761
Universities and technikons	22,036	10,238	-	32,274	32,274	-	100.0%	16,288	16,289
Foreign governments and international organisations	-	-	-	-	-	-	0.0%	П	11
Public corporations and private enterprises	451,138	140,443	5,400	596,981	596,981	-	100.0%	122,861	122,875
Non-profit institutions	262,595	163,221	-	425,816	425,816	-	100.0%	264,346	263,526
Households	296,725	(272,245)	(23,846)	634	633	I	99.8%	8,188	8,928
Payments for capital assets									
Buildings and other fixed structures	-	-	-	-	-	-	0.0%	-	-
Machinery and equipment	805	1,908	-	2,713	2,689	24	99.1%	1,910	8,289
Biological or cultivated assets	-	-	-	-	-	-	0.0%	-	-
Software and other intangible assets	-	-	-	-	-	-	0.0%	-	-
Land and subsoil assets	-	-	-	-	-	-	0.0%	-	-
Total	2,041,936	-	-	2,041,936	2,038,753	3,183	<b>99.8</b> %	1,282,412	1,282,224

		Stat	utory Appr	opriation					
				200	5/06			2004	/05
Details of charges against the National Revenue Fund	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
List all direct charges against the National Revenue Fund									
Minister and Deputy Minister salaries									
Member of executive committee / parliamentary officers/legislature									
Judges and magistrates salaries									
Sector education and training authorities (SETA)									
National Skills Fund									
Total									

# Detail per programme I - Corporate Services and Governance for the year ended 31 March 2006

						2004/05				
	Programme per subprogramme	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final appropriation	Final Appropriation	Actual Expenditure
		R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
1.1	Minister									
	Current payment	843	107	-	950	933	17	98.2%	813	813
	Transfers and subsidies	-	-	-	-	-	-	0.0%	-	-
	Payment for capital assets	-	-	-	-	-	-	0.0%	-	-
1.2	Deputy Minister									
	Current payment	685	100	-	785	776	9	98.9%	780	780
	Transfers and subsidies	-	-	-	-	-	-	0.0%	-	-
	Payment for capital assets	-	-	-	-	-	-	0.0%	-	-
1.3	Management									
	Current payment	3,904	725	-	4,629	4,607	22	99.5%	8,474	8,473
	Transfers and subsidies	8	7	-	15	15	-	100.0%	17	15
	Payment for capital assets	-	46	-	46	46	-	100.0%	266	266
1.3	Corporate Services									
	Current payment	61,911	(2,593)	25,000	84,318	84,002	316	99.6%	51,770	46,772
	Transfers and subsidies	1,421	568	930	2,919	2,909	10	99.7%	121	100
	Payment for capital assets	285	1,144	-	1,429	1,418	11	99.2%	655	5,674
1.4	Governance									
	Current payment	2,504	(156)	-	2,348	2,346	2	99.9%	2,439	2,377
	Transfers and subsidies	3	3	-	6	6	-	100.0%	7	7
	Payment for capital assets	15	49	-	64	64	-	100.0%	10	27
	Total	71,579	-	25,930	97,509	97,122	387	<b>99.6</b> %	65,352	65,304

				2005	6/06			2004/05		
Economic Classification	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final appropriation	Final Appropriation	Actual Expenditure	
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000	
Current payment										
Compensation of employees	35,726	(7,145)	-	28,581	28,533	48	99.8%	28,814	28,748	
Goods and services	34,121	5,299	25,000	64,420	64,102	318	99.5%	35,462	30,264	
Interest and rent on land	-	-	-	-	-	-	0.0%	-	-	
Financial transactions in assets and liabilities	-	29	-	29	29	-	100.0%	-	203	
Transfers and subsidies to:										
Provinces and municipalities	82	10	-	92	87	5	94.6%	106	84	
Departmental agencies and accounts	-	432	-	432	427	5	98.8%	20	20	
Universities and technikons	-	-	-	-	-	-	0.0%	-	-	
Foreign governments and international organisations	-	-	-	-	-	-	0.0%	-	-	
Public corporations and private enterprises	-	8	-	8	8	-	100.0%	-	-	
Non-profit institutions	1,350	-	930	2,280	2,280	-	100.0%	-	-	
Households	-	128	-	128	128	-	100.0%	19	18	
Payments for capital assets										
Buildings and other fixed structures	-	-	-	-	-	-	0.0%	-	-	
Machinery and equipment	300	1,239	-	1,539	I,528	П	99.3%	931	5,967	
Biological or cultivated assets	-	-	-	-	-	-	0.0%	-	-	
Software and other intangible assets	-	-	-	-	-	-	0.0%	-	-	
Land and subsoil assets	-	-	-	-	-	-	0.0%	-	-	
Total	71,579	-	25,930	97,509	97,122	387	<b>99.6</b> %	65,352	65,304	

# Detail per programme 2 - Science and Technology Expert Services for the year ended 31 March 2006

					2005		2004/05			
	Programme per subprogramme	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure
		R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
2.1	Expert Services									
	Current payment	25,708	(2,186)	-	23,522	22,372	1,150	95.1%	16,767	16,781
	Transfers and subsidies	4,147	2,119	-	6,266	6,264	2	100.0%	8,969	8,952
	Payment for capital assets	200	67	-	267	264	3	98.9%	230	223
2.2	National Advisory Council on Innovation									
	Current payment	8,214	(235)	-	7,979	7,459	520	93.5%	6,015	6,005
	Transfers and subsidies	14	-	-	14	7	7	50.0%	12	20
	Payment for capital assets	-	235	-	235	235	-	100.0%	76	83
	Total	38,283	-	-	38,283	36,601	1,682	<b>95.6</b> %	32,069	32,064

			2005/06						2004/05		
Economic Classification	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure		
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000		
Current payment											
Compensation of employees	21,120	(5,158)	-	15,962	15,945	17	99.9%	8,523	8,515		
Goods and services	12,802	2,737	-	15,539	13,886	1,653	89.4%	14,259	14,266		
Interest and rent on land	-	-	-	-	-	-	0.0%	-	-		
Financial transactions in assets and liabilities	-	-	-	-	-	-	0.0%	-	5		
Transfers and subsidies to:											
Provinces and municipalities	77	(20)	-	57	48	9	84.2%	36	26		
Departmental agencies and accounts	-	1,081	-	1,081	1,081	-	100.0%	249	249		
Universities and technikons	130	399	-	529	529	-	100.0%	923	924		
Foreign governments and international organisations	-	-	-	-	-	-	0.0%	П	П		
Public corporations and private enterprises	-	119	-	119	119	-	100.0%	538	538		
Non-profit institutions	3,954	340	-	4,294	4,294	-	100.0%	7,212	7,212		
Households	-	200	-	200	200	-	100.0%	12	12		
Payments for capital assets											
Buildings and other fixed structures	-	-	-	-	-	-	0.0%	-	-		
Machinery and equipment	200	302	-	502	499	3	99.4%	306	306		
Biological or cultivated assets	-	-	-	-	-	-	0.0%	-	-		
Software and other intangible assets	-	-	-	-	-	-	0.0%	-	-		
Land and subsoil assets	-	-	-	-	-	-	0.0%	-	-		
Total	38,283	-	-	38,283	36,601	1,682	<b>95.6</b> %	32,069	32,064		

# Detail per programme 3 - International Cooperation and Resources for the year ended 31 March 2006

						2004/05				
	Programme per subprogramme	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final appropriation	Final Appropriation	Actual Expenditure
		R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
3.1	Multilaterals and Africa									
	Current payment	16,244	(4,101)	-	12,143	12,138	5	100.0%	8,854	8,542
	Transfers and subsidies	24,543	20,733	-	45,276	45,276	-	100.0%	21,769	21,769
	Payment for capital assets	65	50	-	115	115	-	100.0%	58	393
3.2	International Resources									
	Current payment	10,916	3,796	(5,400)	9,312	9,199	113	98.8%	7,734	7,534
	Transfers and subsidies	15,348	(15,322)	-	26	26	-	100.0%	937	869
	Payment for capital assets	41	251	-	292	292	-	100.0%	50	312
3.3	Bilateral Cooperation									
	Current payment	8,741	1,711	-	10,452	10,440	12	99.9%	7,684	7,413
	Transfers and subsidies	7,243	(7,150)	-	93	93	-	100.0%	59	59
	Payment for capital assets	24	32	-	56	56	-	100.0%	42	280
	Total	83,165	-	(5,400)	77,765	77,635	130	99.8%	47,187	47,171

				2005	j/06			2004/05		
Economic Classification	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final appropriation	Final Appropriation	Actual Expenditure	
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000	
Current payment										
Compensation of employees	13,500	(68)	-	13,432	3,4	21	99.8%	9,831	9,818	
Goods and services	22,401	1,474	(5,400)	18,475	18,366	109	99.4%	4,44	13,671	
Interest and rent on land	-	-	-	-	-	-	0.0%	-	-	
Financial transactions in assets and liabilities	-	-	-	-	-	-	0.0%	-	-	
Transfers and subsidies to:										
Provinces and municipalities	36	I.	-	37	37	-	100.0%	35	28	
Departmental agencies and accounts	25,119	200	-	25,319	25,319	-	100.0%	17,280	16,384	
Universities and technikons	726	1,129	-	1,855	1,855	-	100.0%	1,576	1,576	
Foreign governments and international organisations	-	-	-	-	-	-	0.0%	-	-	
Public corporations and private enterprises	619	9,559	-	10,178	10,178	-	100.0%	3,620	3,620	
Non-profit institutions	20,634	(12,637)	-	7,997	7,997	-	100.0%	204	204	
Households	-	9	-	9	9	-	100.0%	50	885	
Payments for capital assets										
Buildings and other fixed structures	-	-	-	-	-	-	0.0%	-	-	
Machinery and equipment	130	333	-	463	463	-	100.0%	150	985	
Biological or cultivated assets	-	-	-	-	-	-	0.0%	-	-	
Software and other intangible assets	-	-	-	-	-	-	0.0%	-	-	
Land and subsoil assets	-	-	-	-	-	-	0.0%	-	-	
Total	83,165	-	(5,400)	77,765	77,635	130	<b>99.8</b> %	47,187	47,171	

# Detail per programme 4 - Frontier Science and Technology for the year ended 31 March 2006

					200		2004/05			
	Programme per subprogramme	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure
		R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
4.1	Frontier Programmes									
	Current payment	3,879	487	-	4,366	4,249	117	97.3%	1,891	I,866
	Transfers and subsidies	781,255	(6,946)	4,970	779,279	779,275	4	100.0%	322,398	322,398
	Payment for capital assets	-	72	-	72	72	-	100.0%	85	85
4.2	Human Capital									
	Current payment	4,814	(2,105)	200	2,909	2,625	284	90.2%	912	935
	Transfers and subsidies	594,637	8,460	-	603,097	603,093	4	100.0%	491,606	491,606
	Payment for capital assets	-	32	-	32	32	-	100.0%	203	203
	Total	1,384,585	-	5,170	1,389,755	1,389,346	409	100.0%	817,095	817,093

					2004/05				
Economic Classification	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final	Final Appropriation	Actual Expenditure
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
Current payment									
Compensation of employees	4,050	(1,656)	-	2,394	2,387	7	99.7%	1,613	1,611
Goods and services	4,643	38	200	4,881	4,487	394	91.9%	1,190	1,190
Interest and rent on land	-	-	-	-	-	-	0.0%	-	-
Financial transactions in assets and liabilities	-	-	-	-	-	-	0.0%	-	-
Transfers and subsidies to:									
Provinces and municipalities	15	-	-	15	7	8	46.7%	5	5
Departmental agencies and accounts	542,729	61,891	500	605,120	605,120	-	100.0%	568,642	568,642
Universities and technikons	20,430	4,731	-	25,161	25,161	-	100.0%	6,124	6,124
Foreign governments and international organisations	-	-	-	-	-	-	0.0%	-	-
Public corporations and private enterprises	444,221	19,642	5,400	469,263	469,263	-	100.0%	44,534	44,534
Non-profit institutions	189,377	94,077	(930)	282,524	282,524	-	100.0%	194,587	194,587
Households	179,120	(178,827)	-	293	293	-	100.0%	112	112
Gifts and donations									
Payments for capital assets									
Buildings and other fixed structures	-	-	-	-	-	-	0.0%	-	-
Machinery and equipment	-	104	-	104	104	-	100.0%	288	288
Biological or cultivated assets	-	-	-	-	-	-	0.0%	-	-
Software and other intangible assets	-	-	-	-	-	-	0.0%	-	-
Land and subsoil assets	-	-	-	-	-	-	0.0%	-	-
Total	1,384,585	-	5,170	1,389,755	1,389,346	409	100.0%	817,095	817,093

# Detail per programme 5 - Government Sector Programmes and Coordination for the year ended 31 March 2006

						2004/05				
	Programme per subprogramme	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final appropriation	Final Appropriation	Actual Expenditure
		R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
5.1	Science and Technology for Economic Impact									
	Current payment	7,528	(568)	(1,354)	5,606	5,257	349	93.8%	9,350	9,416
	Transfers and subsidies	253,506	(9,584)	-	243,922	243,919	3	100.0%	136,361	136,171
	Payment for capital assets	90	(44)	-	46	42	4	91.3%	100	368
5.2	Science and Technology for Social Impact									
	Current payment	2,585	(610)	-	1,975	1,879	96	95.1%	3,274	4,070
	Transfers and subsidies	196,863	11,183	(23,846)	184,200	184,197	3	100.0%	168,367	167,150
	Payment for capital assets	55	(13)	-	42	39	3	92.9%	45	119
5.3	Sector Research and Development Planning									
	Current payment	3,161	(351)	-	2,810	2,696	114	95.9%	3,116	3,036
	Transfers and subsidies	506	-	(500)	6	6	-	100.0%	6	6
	Payment for capital assets	30	(13)	-	17	14	3	82.4%	90	256
	Total	464,324	-	(25,700)	438,624	438,049	575	<b>99.9</b> %	320,709	320,592

					2004/05				
Economic Classification	Adjusted Appropriation	Shifting of Funds	Virement	Final Appropriation	Actual Expenditure	Variance	Expenditure as % of final appropriation	Final Appropriation	Actual Expenditure
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
Current payment									
Compensation of employees	5,800	(938)	-	4,862	4,849	13	99.7%	9,483	9,512
Goods and services	7,474	(591)	(1,354)	5,529	4,983	546	90.1%	6,257	7,010
Interest and rent on land	-	-	-	-	-	-	0.0%	-	-
Financial transactions in assets and liabilities	-	-	-	-	-	-	0.0%	-	-
Transfers and subsidies to:									
Provinces and municipalities	19	-	-	19	14	5	73.7%	6,600	6,589
Departmental agencies and accounts	278,923	(101,181)	(500)	177,242	177,242	-	100.0%	145,962	145,466
Universities and technikons	750	3,979	-	4,729	4,729	-	100.0%	7,665	7,665
Foreign governments and international organisations	-	-	-	-	-	-	0.0%	-	-
Public corporations and private enterprises	6,298	111,115	-	117,413	117,413	-	100.0%	74,169	74,183
Non-profit institutions	47,280	81,441	-	128,721	128,721	-	100.0%	62,343	61,523
Households	117,605	(93,755)	(23,846)	4	3	L	75.0%	7,995	7,901
Payments for capital assets									
Buildings and other fixed structures	-	-	-	-	-	-	0.0%	-	-
Machinery and equipment	175	(70)	-	105	95	10	90.5%	235	743
Biological or cultivated assets	-	-	-	-	-	-	0.0%	-	-
Software and other intangible assets	-	-	-	-	-	-	0.0%	-	-
Land and subsoil assets	-	-	-	-	-	-	0.0%	-	-
Total	464,324	-	(25,700)	438,624	438,049	575	<b>99.9</b> %	320,709	320,592

#### Notes to the Appropriation Statement for the year ended 31 March 2006

# I. Detail of transfers and subsidies as per Appropriation Act (after virement)

Detail of these transactions can be viewed in note 7 (Transfers and subsidies) and Annexure I (A-O) to the annual financial statements.

# 2. Detail of specifically and exclusively appropriated amounts voted (after virement)

Detail of these transactions can be viewed in note I (Annual Appropriation) to the annual financial statements.

### 3. Detail of financial transactions in assets and liabilities

Detail of these transactions per programme can be viewed in note 6 (Financial transactions in assets and liabilities) to the annual financial statements.

### 4. Explanations of material variances from Amounts Voted (after virement):

#### 4.1 Per programme

Programme 1: Corporate Services and Governance	Final Appropriation	Actual Expenditure Variance a Final Ap		
	R'000	R'000	R'000	%
Current	93,029	92,663	366	0.39
Transfers	2,940	2,930	10	0.34
Capital	I,540	1,529	11	0.71

Programme 2: Science and Technology Expert Services	Final Appropriation	Actual Expenditure Variance Final A		Variance as a % of Final Approp
	R'000	R'000	R'000	%
Current	31,501	29,831	۱,670	5.30
Transfers	6,280	6,271	9	0.14
Capital	502	499	3	0.60

The savings are mainly attributed to the goods and services economic classification and relate to consultants and special services that were not utilised during the financial year.

Programme 3: International Cooperation and Resources	Final Appropriation	Actual Expenditure Variance a Final Ap		Variance as a % of Final Approp
	R'000	R'000	R'000	%
Current	31,906	31,777	129	0.40
Transfers	45,396	45,396	-	-
Capital	463	463	-	-

# Notes to the Appropriation Statement for the year ended 31 March 2006

Programme 4: Frontier Science and Technology	Final Appropriation	Actual Expenditure	Variance	Variance as a % of Final Approp	
	R'000	R'000	R'000	%	
Current	7,274	6,874	400	5.50	
Transfers	I,382,377	1,382,368	9	0.00	
Capital	104	104	-	-	

Programme 5: Government Sector Programmes and Coordination	Final Appropriation	Actual Expenditure	Variance	Variance as a % of Final Approp
	R'000	R'000	R'000	%
Current	10,392	9,832	560	5.39
Transfers	428,127	428,121	6	0.00
Capital	105	95	10	9.52

Des servers des l'Assiste	2005/06
Per economic classification	R'000
Current payment:	
Compensation of employees	65,124
Goods and services	105,824
Financial transactions in assets and liabilities	29
Transfers and subsidies:	
Provinces and municipalities	193
Departmental agencies and accounts	809,189
Universities and technikons	32,274
Public corporations and private entities	596,981
Foreign governments and international organisations	-
Non-profit institutions	425,816
Households	633
Payments for capital assets:	
Machinery and equipment	2,689

# Statement of Financial Performance for the year ended 31 March 2006

	N.L.	2005/06	2004/05
	Note	R'000	R'000
REVENUE			
Annual appropriation	Ι	2,041,936	1,282,412
Departmental revenue	2	229	302
Local and foreign aid assistance	3	32	4,515
TOTAL REVENUE		2,042,197	I,287,229
EXPENDITURE			
Current expenditure			
Compensation of employees	4	65,125	58,204
Goods and services	5	105,824	66,401
Financial transactions in assets and liabilities	6	29	208
Local and foreign aid assistance	3	-	4,760
Total current expenditure		170,978	129,573
Transfers and subsidies	7	1,865,086	1,149,122
Expenditure for capital assets			
Machinery and equipment	8	2,689	8,289
Total expenditure for capital assets		2,689	8,289
		(	
TOTAL EXPENDITURE		2,038,753	I,286,984
SURPLUS/(DEFICIT) FOR THE YEAR		3,444	245
Reconciliation of Net Surplus/(Deficit) for the year	12	2 1 0 2	100
voted tunas	12	3,183	188
Departmental revenue	13	229	302
Local and foreign aid assistance	ک	32	(245)
			245
SURFLUS/(DEFICIT) FUR THE TEAK		5,444	245

# Statement of Financial Position as at 31 March 2006

	Nete	2005/06	2004/05
	Note	R'000	R'000
ASSETS			
Current assets		6,305	774
Cash and cash equivalents	9	4,999	(129)
Prepayments and advances	10	204	296
Receivables	11	1,102	575
Local and foreign aid assistance receivable	3	-	32
TOTAL ASSETS		6,305	774
LIABILITIES			
Current liabilities		6,302	769
Voted funds to be surrendered to the Revenue Fund	12	3,183	188
Departmental revenue to be surrendered to the Revenue Fund	13	4	21
Payables	14	3,115	560
TOTAL LIABILITIES		6,302	769
NET ASSETS		3	5
Represented by:			
Recoverable revenue		3	5
TOTAL		3	5

# Statement of Changes in Net Assets for the year ended 31 March 2006

	N	2005/06	2004/05
	Note	R'000	R'000
Recoverable revenue			
Opening balance		5	
Transfers		(2)	5
Debts written off		-	-
Debts revised		-	-
Debts recovered (included in departmental revenue)		(2)	-
Debts raised			
Closing balance		3	5
TOTAL		3	5

# Cash Flow Statement for the year ended 31 March 2006

	Nata	2005/06	2004/05
	Note	R'000	R'000
CASH FLOWS FROM OPERATING ACTIVITIES			
Receipts	_	2,042,197	1,287,229
Annual appropriated funds received	1.1	2,041,936	1,282,412
Departmental revenue received		229	302
Local and foreign aid assistance received	3	32	4,515
Net (increase)/decrease in working capital		2,120	469
Surrendered to Revenue Fund		(434)	(2,099)
Current payments		(170,978)	(129,573)
Transfers and subsidies paid	_	(1,865,086)	(1,149,122)
Net cash flow available from operating activities	15	7,819	6,904
CASH FLOWS FROM INVESTING ACTIVITIES			
Payments for capital assets		(2,689)	(8,289)
Net cash flows from investing activities	-	(2,689)	(8,289)
CASH FLOWS FROM FINANCING ACTIVITIES			
Increase/(decrease) in net assets		(2)	-
Net cash flows from financing activities	-	(2)	
Net increase/(decrease) in cash and cash equivalents		5,128	(1,385)
Cash and cash equivalents at the beginning of the period		(129)	1,256
Cash and cash equivalents at end of period	16	4,999	(129)

#### I. Annual Appropriation

#### I.I Annual Appropriation

Included are funds appropriated in terms of the Appropriation Act for National Departments (Voted funds)

	Final Appropriation	Actual Funds Received	Funds not requested/ not received	Appropriation received 2004/05
	R'000	R'000	R'000	R'000
Programme 1: Corporate Services and Governance	97,509	97,509	-	65,352
Programme 2: Science and Technology Expert Services	38,283	38,283	-	32,069
Programme 3: International Cooperation and Resources	77,765	77,765	-	47,187
Programme 4: Frontier Science and Technology	1,389,755	1,389,755	-	817,095
Programme 5: Government Sector Programmes and Coordination	438,624	438,624	-	320,709
Total	2,041,936	2,041,936	-	1,282,412

#### 2. Departmental revenue to be surrendered to revenue fund Description

	Notes	2005/06	2004/05
		R'000	R'000
Sales of goods and services other than capital assets	2.1	43	46
Financial transactions in assets and liabilities	2.2	186	256
Departmental revenue collected		229	302

#### 2.1 Sales of goods and services other than capital assets

	2005/06	2004/05
	R'000	R'000
Sales of goods and services produced by the department	43	46
Administrative fees	43	46
Total		

### 2.2 Financial transactions in assets and liabilities Nature of loss recovered

	2005/06	2004/05
	R'000	R'000
Other receipts	186	256
Total	186	256

### Notes to the Annual Financial Statements for the year ended 31 March 2006

#### 3. Local and foreign aid assistance

#### 3.1 Assistance received in cash: Other

	2005/06	2004/05
Foreign	R'000	R'000
Opening balance	(32)	213
Revenue	32	4,515
Expenditure	-	4,760
Current	-	4,760
Capital	-	-
Closing balance	-	(32)
Total		
Opening balance	(32)	213
Revenue	32	4,515
Expenditure		4,760
Current	-	4,760
Capital	-	-
Closing balance	-	(32)
Analysis of balance		
Local and foreign aid receivable	-	32
Local and foreign aid unutilised	-	-
Local and foreign aid payable to RDP fund/donors		-
Closing balance	-	32

The R32 thousand does not represent an actual withdrawal from the RDP Fund in respect of the European Union funded project (GODISA) but an accounting adjustment for an erroneous expenditure allocation during the previous financial year.

#### 4. Compensation of employees

#### 4.1 Salaries and wages

	2005/06	2004/05
	R'000	R'000
Basic salary	42,998	38,653
Performance award	1,258	1,434
Service based	347	273
Compensative/circumstantial	1,832	1,059
Periodic payments	406	840
Other non-pensionable allowances	11,591	9,05 I
Total	58,432	51,310

#### 4.2 Social contributions

5.

4.2.1 Employer contributions	2005/06	2004/05
	R'000	R'000
Pension	4,762	5,024
Medical	1,924	I,863
UIF	-	-
Bargaining council	7	7
Official unions and associations	-	-
Insurance	-	-
	6,693	6,894
Total compensation of employees	65,125	58,204

 Average number of employees
 220
 202

Goods and services	Note	2005/06	2004/05
		R'000	R'000
Advertising		3,948	3,375
Attendance fees (including registration fees)		3,012	2,376
Bank charges and card fees		94	90
Bursaries (employees)		259	306
Communication		4,648	4,131
Computer services		3,189	5,458
Consultants, contractors and special services		42,396	15,424
Courier and delivery services		386	341
Drivers licences and permits		I	I
Entertainment		1,296	857
External audit fees	5.1	1,540	740
Equipment less than R5 000		8,684	2,040
Honoraria (voluntary workers)		-	7
Inventory	5.2	4,197	5,645
Maintenance, repair and running costs		111	30
Operating leases		1,107	674
Personnel agency fees		1,169	515
Photographic services		776	787
Plants, flowers and other decorations		69	89
Printing and publications		34	449
Resettlement cost		211	219
Subscriptions		618	527
Travel and subsistence	5.3	24,874	17,296
Venues and facilities		3,201	4,981
Protective, special clothing & uniforms		4	43
Total		105,824	66,401

			2005/06	2004/05
			R'000	R'000
5.1	External audit fees			
	Regulatory audits		1,540	711
	Other audits			29
	Total external audit fees		I,540	740
			2005/06	2004/05
			R'000	R'000
5.2	Inventory			
	Domestic consumables		88	603
	Fuel, oil and gas		205	115
	Other consumables		-	I
	Parts and other maintenance material		188	225
	Stationery and printing		3,716	4,701
	Total Inventory		4,197	5,645
			2005/06	2004/05
			R'000	R'000
5.3	Travel and subsistence			
	Local		,  7	9,605
	Foreign		13,757	7,691
	Total travel and subsistence		24,874	17,296
6.	Financial transactions in assets and liabilities			
		Note	2005/06	2004/05
			R'000	R'000
	Other material losses written off	6.1	29	208
	Total		29	208
6.1	Other material losses		2005/06	2004/05
	Nature of losses		R'000	R'000
	Damages to hired vehicles		28	22
	Traffic offences		I	-
	Accidents with hired vehicles		-	186
	Total		29	208

# Notes to the Annual Financial Statements for the year ended 31 March 2006

7.	Transfers and subsidies	Note	2005/06	2004/05
			R'000	R'000
	Provinces and municipalities	Annex IF	193	6,732
	Departmental agencies and accounts	Annex IG	809,189	730,761
	Universities and technikons	Annex 1H	32,274	16,289
	Foreign governments and international organisations	Annex IJ	-	11
	Public corporations and private enterprises	Annex 11	596,981	122,875
	Non-profit institutions	Annex IK	425,816	263,526
	Households	Annex 1L	633	8,928
	Total		1,865,086	1,149,122
8.	Expenditure for capital assets	Note	2005/06	2004/05
			R'000	R'000
	Machinery and equipment	Annex 4	2,689	8,289
	Total		2,689	8,289
9.	Cash and cash equivalents		2005/06	2004/05
			R'000	R'000
	Domestic			
	Consolidated paymaster general account		4,969	(159)
	Cash on hand		30	30
	Total		4,999	(129)
10.	Prepayments and advances		2005/06	2004/05
			R'000	R'000
	Description			
	Staff advances		2	2
	Travel and subsistence		202	294
	Total		204	296

### II. Receivables

	Less than one year	One to three years	Older than three years	2005/06	2004/05
	R'000	R'000	R'000	Total R'000	Total R'000
Households and non-profi	t 536	-	-	536	-
Staff debtors 11.2	(1)	3	-	2	9
Other debtors 11.3	101	287	-	388	360
Claims recoverable Annex 6	25	151	-	176	206
Total	661	441	-	1,102	575

		2005/06	2004/05
		R'000	R'000
11.1	Households and non-profit institutions	536	-
	South African Agency for the Advancement of Science and Technology		
	Total	536	-
11.2	Staff debtors	2	6
	Travel and subsistence debt	-	3
	Salary overpayment	2	9
	Total		

	2005/06	2004/05
Other debtors	R'000	R'000
Persal salaries and stoppages	106	23
Claims recoverable: Other recoverable amounts	85	145
Claims recoverable: Theft and losses	107	87
Previous employees and other persons		
Travel and subsistence debt	81	96
Income tax debt	2	2
Salary overpayment	3	3
Leave without pay	4	4
Total	388	360
	Other debtors Persal salaries and stoppages Claims recoverable: Other recoverable amounts Claims recoverable: Theft and losses Previous employees and other persons Travel and subsistence debt Income tax debt Salary overpayment Leave without pay <b>Total</b>	2005/06Other debtorsR'000Persal salaries and stoppages106Claims recoverable: Other recoverable amounts85Claims recoverable: Theft and losses107Previous employees and other persons107Travel and subsistence debt81Income tax debt2Salary overpayment3Leave without pay4Total388

#### 12. Voted funds to be surrendered to the Revenue Fund

	2005/06	2004/05
	R'000	R'000
Opening balance	188	1,737
Transfer from Statement of Financial Performance	3,183	188
Paid during the year	(188)	(1,737)
Closing balance	3,183	188

#### 13. Departmental revenue to be surrendered to the Revenue Fund

	2005/06	2004/05
	R'000	R'000
Opening balance	21	81
Transfer from Statement of Financial Performance	229	302
Paid during the year	(246)	(362)
Closing balance	4	21

# Notes to the Annual Financial Statements for the year ended 31 March 2006

### 14. Payables - current

Description	Notes	30 Days	30+ Days	2005/06	2004/05
				Total	Total
Clearing accounts	14.1	-	3,017	3,017	500
Other payables	14.2	50	48	98	60
Total		50	3,065	3,115	560
				2005/06	2004/05

		R'000	R'000
14.1	Clearing accounts		
	National Service Sector Development Framework: 'Leveraging Service for Growth, Employment and Equity project'	3,017	500
	Total	3,017	500
		2005/06	2004/05

		R'000	R'000
14.2	Other payables		
	Persal salaries and stoppages	2	20
	Other	96	40
	Total	98	60

#### 15 Net cash flow available from operating activities

	2005/06	2004/05
	R'000	R'000
Net surplus/(deficit) as per Statement of Financial Performance	3,444	245
Non-cash movements		
(Increase)/decrease in receivables – current	(527)	(127)
(Increase)/decrease in prepayments and advances	92	52
(Increase)/decrease in other current assets	32	(32)
Increase/(decrease) in payables – current	2,555	544
Surrenders to revenue fund	(434)	(2,099)
Expenditure on capital assets	2,689	8,289
Other non-cash items	(32)	32
Net cash flow generated by operating activities	7,819	6,904

#### 16. Reconciliation of cash and cash equivalents for cash flow purposes

Total	4,999	(129)
Cash on hand	30	30
Consolidated Paymaster General account	4,969	(159)
	R'000	R'000
	2005/06	2004/05

# Disclosure Notes to the Annual Financial Statements for the year ended 31 March 2006

These amounts are not recognised in the Annual Financial Statements and are disclosed to enhance the usefulness of the annual financial statements.

			Note	2005/06	2004/05
17.	Contingent liabilities			R'000	R'000
	Liable to	Nature			
	Housing loan guarantees	Employees	Annex 3A	541	642
	Other departments (interdepartmental unconfirmed balances)		Annex 7	74	76
	Total			615	718
				2005/06	2004/05
				R'000	R'000
18.	Commitments				
	Current expenditure				
	Approved and contracted			3,581	I
	Approved but not yet cor	ntracted		-	-
				3,581	I
	Capital expenditure				
	Approved and contracted			34	45
	Approved but not yet cor	ntracted		-	-
				34	45
	Total commitments			3,615	46

19.	Accruals	30 Days	30+ Days	2005/06	2004/05
	Listed by economic classification			R'000 Total	R'000 Total
	Compensation of employees			-	114
	Goods and services	3	3,141	3,144	3,801
	Machinery and equipment	I	36	37	6
	Other				
				3,181	3,921

# Disclosure Notes to the Annual Financial Statements for the year ended 31 March 2006

20.

21.

			Note	2005/06	2004/05
				R'000	R'000
Listed by programme	level				
Programme 1: Corporate	Services and Govern	ance		3,098	2,065
Programme 2: Science and	Technology Expert S	Services		78	-
Programme 3: Internation	al Cooperation and F	Resources		3	790
Programme 4: Frontier Sc	ience and Technology	,		-	76
Programme 5: Governmer	nt Sector Programme	s and Coordination		2	990
Total				3,181	3,921
Confirmed balances w	ith other departm	ents	Annex 7	1,370	5
Total				1,370	5
				2005/06	2004/05
				R'000	R'000
Employee benefits					
Leave entitlement				1,214	534
Thirteenth cheque				1,535	1,313
Performance awards				-	-
Capped leave commitmen	ts			2,151	2,362
Total				4,900	4,209
•			N4 1.		
Lease commitments	Land	Buildings and other fixed structures	Machinery and equipment	2005/06 Total	2004/05 Total
	R'000	R'000	R'000	R'000	R'000
Operating leases					

Total present value of lease liabilities		-	1,898	1,898	2,361
Later than 5 years	-	-	-	-	-
Later than I year and not later than 5 years	-	-	596	596	1,116
Not later than I year	-	-	1,302	1,302	1,245
 Operating leases					

	Total	229	302
	Financial transactions in assets and liabilities	186	256
	Sales of goods and services other than capital assets	43	46
22.	Receivables for departmental revenue		
		R'000	R'000
		2005/06	2004/05

#### 23. Related party transactions

No related party transactions took place during the period under review, other than transactions that occur within a normal supplier/client relationship on terms and conditions no more or less favourable than those which it is reasonable to expect the department would have adopted if dealing with that individual or entity at arm's length in the same circumstances

#### 24. Key management personnel

The aggregate compensation of the senior management of the department and the number of individuals determined on a full time equivalent basis receiving compensation within this category for the current period and the comparative period.

	No. of	2005/06	2004/05
	Individuals	R'000	R'000
Political office bearers	2	1,432	1,369
Officials			
Level 15 to 16	6	4,120	3,511
Level 14	I	528	430
Family members of key management personnel		-	
Total		6,080	5,310

### ANNEXURE IF

#### STATEMENT OF UNCONDITIONAL GRANTS AND TRANSFERS TO MUNICIPALITIES

~		GRANT ALI			TRANSFER			SPENT		2004/05
VAME OF MUNICIPALIT	Amount	Roll Overs	Other Adjustments	Total Available	Actual Transfer	% of Available funds Transferred	Amount received by municipality	Amount spent by municipality	% of available funds spent by municipality	Total Available
2	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000	%	R'000
Regional										
Service Council										
Levies:										
Tshwane										
Metropolitan										
Municipality	229	-	(9)	220	193	87.7%				171
Buffalo City										5,5611
Fetakgomo										
Municipality										1,000
Total	229	-	(9)	220	193		-	-		6,732

# ANNEXURE IG

### STATEMENT OF TRANSFERS TO DEPARTMENTAL AGENCIES AND ACCOUNTS

		TRANSFER A	LLOCATION		TRAN	NSFER	2004/2005
AGENCY/ACCOUNT	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	% of available funds Transferred	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	%	R'000
Technology Planning and Diffusion	56,263	-	(49,793)	6,470	6,470	100.0%	3,246
Public Assets	43,000	-	-	43,000	43,000	100.0%	35,000
Indigenous Knowledge Systems	-	-	-	-	-	-	544
Human Sciences Research Council	104,293	-	-	104,293	104,293	100.0%	83,336
Technology for Poverty Alleviation	-	-	1,479	1,479	1,479	100.0%	-
Technology for Sustainable Livelihoods	-	-	1,350	1,350	1,350	100.0%	6,420
Learnerships	3,367	-	(3,367)	-	-	-	-
Global Science	6,151	-	49	6,200	6,200	100.0%	15
Africa Institute of South Africa	18,968	-	-	18,968	18,968	100.0%	16,325
Natural Resources	-	-	650	650	650	100.0%	2,000
Advanced Manufacturing Technology Strategy	31,500	-	(31,500)	-	-	-	464
Innovation Fund	-	-	-	-	-	-	74,800
National Laser Centre	8,028	-	(8,028)	-	-	-	6,500
National Energy Research Institute	20,000	-	(20,000)	-	-	-	-
South African Aids Vaccine Initiative	20,000	-	-	20,000	20,000	100.0%	15,000
National Research Foundation	516,881	-	-	516,881	516,881	100.0%	454,288
Science and Youth	-	-	-	-	-	-	450
Grant-In-Aid: Various Institutions Current	-	-	I,000	1,000	1,000	100.0%	-
Centres of Excellence	15,000	-	5,000	20,000	20,000	100.0%	2,500
Science Themes	2,650	-	11,989	14,639	14,639	100.0%	29,560
Human Resource Development	-	-	12,600	12,600	12,600	100.0%	-
Frontier Science and Technology	170	-	21,800	21,970	21,970	100.0%	-
Equipment Placement	-	-	11,000	11,000	11,000	100.0%	-
Square Kilometre Array	-	-	8,000	8,000	8,000	100.0%	-
Indicators	500	-	(500)	-	-	-	-
Donations and Gifts	-	-	694	694	689	99.3%	313
Total	846,771	-	(37,577)	809,194	809,189		730,761

#### **ANNEXURE IH**

### STATEMENT OF TRANSFERS TO UNIVERSITIES AND TECHNIKONS

		TRANSFER A	LLOCATION		I	2004/2005		
UNIVERSITY/TECHNIKON	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	Amount not transferred	% of Available funds Transferred	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000
North West University	-	-	13	13	13	-	100.0%	1,160
Tshwane University of Technology	-	-	50	50	50	-	100.0%	418
University of KwaZulu-Natal	-	-	757	757	757	-	100.0%	900
University of Pretoria	2,369	-	-	2,369	2,369	-	100.0%	100
University of Free State	-	-	100	100	100	-	100.0%	90
University of Cape Town	1,945	-	-	1,945	1,945	-	100.0%	888
University of Fort Hare	-	-	100	100	100	-	100.0%	1,090
University of Stellenbosch	17,722	-	8,678	26,400	26,400	-	100.0%	3,400
University of Venda	-	-	200	200	200	-	100.0%	340
University of Western Cape	-	-	12	12	12	-	100.0%	2,253
University of Witwatersrand	-	-	228	228	228	-	100.0%	2,874
University of Limpopo	-	-	100	100	100	-	100.0%	-
University of Randse Afrikaanse	-	-	-	-	-	-	-	298
University of Zululand	-	-	-	-	-	-	-	70
Technikon Witwatersrand	-	-	-	-	-	-	-	2,400
University of Rhodes	-	-	-	-	-	-	-	8
Total	22,036	-	10,238	32,274	32,274	-		16,289

#### ANNEXURE II STATEMENT OF TRANSFERS/SUBSIDIES TO PUBLIC CORPORATIONS AND PRIVATE ENTERPRISES

		TRANSFER A	LLOCATION				2004/2005		
NAME OF PUBLIC CORPORATE/PRIVATE ENTERPRISE	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	% of Available funds Transferred	Capital	Current	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000	R'000
Private Enterprises									
Council for Scientific and Industrial Research	451,138	-	135,876	587,014	587,014	100.0%	-	587,014	104,205
Council for Mineral Technology	-	-	9,949	9,949	9,949	100.0%	-	9,949	18,653
Donations and Gifts			18	18	18	100.0%	-	18	17
Total	451,138	-	145,843	596,981	596,981		-	596,981	122,875

### **ANNEXURE IJ**

#### STATEMENT OF TRANSFERS TO FOREIGN GOVERNMENT AND INTERNATIONAL ORGANISATIONS



# ANNEXURE IK

#### STATEMENT OF TRANSFERS TO NON-PROFIT ORGANISATIONS

		TRANSFER A	LLOCATION		TRAN	NSFER	2004/2005
NON-PROFIT ORGANISATIONS	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	% of Available funds Transferred	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	%	R'000
Transfers							
Academy of Science of SA	-	-	-	-	-	-	47
Acorn Technologies	-	-	-	-	-	-	35
Africa Genome Education Institute	-	-	300	300	300	100.0%	-
Agama Bioenergy	-	-	-	-	-	-	1,600
Amatola Water Board	-	-	8,815	8,815	8,815	100.0%	-
Bayworld Centre for Research and Education	-	-	-	-	-	-	55
Beyond 2000	-	-	-	-	-	-	200
Biopad Regional Innovation Centre Trust	60,050	-	-	60,050	60,050	100.0%	34,183
Black Science, Technology and Engineering Professionals	-	-	50	50	50	100.0%	-
Boitjhorisong Science Resource Centre	-	-	100	100	100	100.0%	90
Bokamoso	-	-	100	100	100	100.0%	-
Cape Biotech Trust	13,282	-	6,218	19,500	19,500	100.0%	34,183
Central Energy Fund	21,900	-	-	21,900	21,900	100.0%	4,800
Council for Geosciences	-	-	5,075	5,075	5,075	100.0%	16
Council for Mineral Technology	-	-	216	216	216	100.0%	-
Council for Science and Industrial Research	-	-	3,934	3,934	3,934	100.0%	-
Da Vinci Research Institute	-	-	2,280	2,280	2,280	100.0%	500
Department of Housing and Local Government (N. Cape)	-	-	2,000	2,000	2,000	100.0%	-
Durban Institute of Technology	-	-	-	-	-	-	500
East Coast Biotechnology Regional	-	-	39,500	39,500	39,500	100.0%	34,183

# ANNEXURE IK (CONTINUED)

### STATEMENT OF TRANSFERS TO NON-PROFIT ORGANISATIONS

		TRANSFER A	LLOCATION		TRAN	ISFER	2004/2005
NON-PROFIT ORGANISATIONS	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	% of Available funds Transferred	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	%	R'000
Egolibio Incubator	-	-	-	-	-	-	29
Eskom Corporate	-	-	-	-	-	-	600
Eskom Expo for Young Scientists	-	-	220	220	220	100.0%	200
Foundation of Tertiary Institutions of the Northern Metropolis	-	-	-	-	-	-	10
Gateway Discovery Trust	-	-	200	200	200	100.0%	120
GISSA Conferences	-	-	130	130	130	100.0%	-
Giyani Science Centre	-	-	-	-	-	-	90
Global Conferences Africa	-	-	500	500	500	100.0%	-
GODISA Trust	24,000	-	-	24,000	24,000	100.0%	24,225
Grahamstown Foundation	-	-	220	220	220	100.0%	200
Hermanus Magnetic Observatory	-	-	-	-	-	-	7
Horisane Bohane Marivate	-	-	-	-	-	-	23
Imbaula cc	-	-	-	-	-	-	500
Indigenous Knowledge Systems of SA trust	-	-	2,000	2,000	2,000	100.0%	1,500
Innovation Trust	101,597	-	-	101,597	101,597	100.0%	50,000
Interactive Science Foundation MTN Science Centre	-	-	40	40	40	100.0%	84
Ithemba Labs	-	-	45	45	45	100.0%	33
Kara Heritage Institute	-	-	-	-	-	-	500
Kirkpatrick and Associates	-	-	-	-	-	-	1,388
Mamelodi Resources	-	-	770	770	770	100.0%	-
Medical Research Council	-	-	-		-	-	12,165
Meeting of Minds	-	-	1,600	1,600	1,600	100.0%	-
MTN Science Centre	-	-	100	100	100	100.0%	90
National Bioinformatics Network Trust	-	-	14,977	14,977	14,977	100.0%	13,260
National Science and Technology Forum	-	-	100	100	100	100.0%	-
NC Songelwa	-	-	-	-	-	-	100
Old Mutual MTN Science Centre	-	-	15	15	15	100.0%	90
Pediatric HIV Foundation	-	-	-	-	-	-	1,350
PBMR (Pty) Ltd	-	-	-	-	-	-	5,000
People Learning and Training online	-	-	200	200	200	100.0%	200
Phumani Paper	-	-	750	750	750	100.0%	-
Plant Biotechnology Regional Innovation Centre	-	-	19,998	19,998	19,998	100.0%	7,658
SA Agency for Science and Technology Advancement	-	-	14,400	14,400	14,400	100.0%	5,889
Salamax 320	-	-	150	150	150	100.0%	-
Sci-Bono Discovery Centre	-	-	100	100	100	100.0%	90
South African Academy of Engineering	-	-	24	24	24	100.0%	-
South African Astronomical Observatory	-	-	66	66	66	100.0%	22
South African Chemical Institute	-	-	108	108	108	100.0%	-

### ANNEXURE IK (CONTINUED)

#### STATEMENT OF TRANSFERS TO NON-PROFIT ORGANISATIONS

		TRANSFER A	LLOCATION		TRAN	2004/2005	
NON-PROFIT ORGANISATIONS	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	% of Available funds Transferred	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	%	R'000
South African Institute for Aquatic Biodiversity	-	-	67	67	67	100.0%	-
South African Institute of Physics	-	-	514	514	514	100.0%	-
South African Mathematics Foundation	-	-	1,396	1,396	1,396	100.0%	-
South African National Biodiversity Institute	-	-	200	200	200	100.0%	-
Southern African Association for Research in Mathematics, Science and Technology Education	-	-	18	18	18	100.0%	-
Southern African Research and Innovation Management Assoc.	-	-	-	-	-	-	600
Standards South Africa	-	-	2,936	2,936	2,936	100.0%	-
Successful Events	-	-	-	-	-	-	114
Sustainable Energy Africa	-	-	-	-	-	-	500
TEMM International	-	-	-	-	-	-	800
Tertiary Education Network (TENET)	-	-	-	-	-	-	3,000
The Innovation Hub Management Company	-	-	-	-	-	-	9
The SA Institute of Aquatic Biodiversity	-	-	-	-	-	-	10
The Science Centre	-	-	100	100	100	100.0%	-
The South African Nuclear Energy Corporation	-	-	26,706	26,706	26,706	100.0%	-
Thukuka Education Upliftment Fund	-	-	4,685	4,685	4,685	100.0%	-
Timbali Technology Incubator	-	-	-	-	-	-	35
Tshumisano Trust	39,266	-	-	39,266	39,266	100.0%	19,461
Umgeni Water	-	-	-	-	-	-	12
University of Limpopo	-	-	-	-	-	-	590
Unizul Science Centre	-	-	100	100	100	100.0%	-
UWESCO Investments	-	-	98	98	98	100.0%	-
Water Research	-	-	600	600	600	100.0%	-
Wits Health Consortium	-	-	500	500	500	100.0%	-
Z-Coms	-	-	-	-	-	-	80
	260,095	-	163,221	423,316	423,316		261,026
Subsidies							
Academy of Science of South Africa	2,500	-	-	2,500	2,500	100.0%	2,500
	2,500	-	-	2,500	2,500		2,500
Total	262,595	-	163,221	425,816	425,816		263,526

#### ANNEXURE IL STATEMENT OF TRANSFERS TO HOUSEHOLDS

		TRANSFER A	LLOCATION		EXPENI	2004/2005	
HOUSEHOLDS	Appropriation Act	Roll Overs	Adjustments	Total Available	Actual Transfer	% of Available funds Transferred	Appropriation Act
	R'000	R'000	R'000	R'000	R'000	%	R'000
Transfers							
Agricultural Research Council	-	-	-	-	-	-	100
Beaufort West Hydroponics Company	-	-	-	-	-	-	1,900
Imbaula Implementing Agency	-	-	-	-	-	-	1,400
Institute of Natural Research	-	-	-	-	-	-	3,100
KZN Dept of Agriculture & Environment Affairs	-	-	-	-	-	-	1,000
The Agricultural and Rural Development Research Institute	-	-	-	-	-	-	400
Telkom South Africa	296,725	-	(296,091)	634	250	39.4%	-
Donations and Gifts	-	-	-	-	383	-	1,028
Total	296,725	-	(296,091)	634	633		8,928

#### **ANNEXURE IO**

STATEMENT OF GIFTS, DONATIONS AND SPONSORSHIPS MADE AND REMISSIONS, REFUNDS AND PAYMENTS MADE AS AN ACT OF GRACE FOR THE YEAR ENDED 31 MARCH 2006

	2005/06				
NATURE OF GIFT, DONATION OR SPONSORSHIP	R'000				
Paid in cash	-				
South African Women in Science Awards					
Corporate and promotional gifts*	890				
TOTAL					

\* Gifts/promotional items to foreign and local dignitaries, guest speakers at departmental events, participants in workshops/conferences and to the general public during science and technology events. It is however not practical to list all recipients individually.

# **ANNEXURE 3**

#### STATEMENT OF FINANCIAL GUARANTEES ISSUED AS AT 31 MARCH 2006 - LOCAL

Guarantor institution	Guarantee in respect of	Original guaranteed capital amount	Opening balance 1 April 2005	Guarantees issued during the year	Guarantees released/paid/ cancelled/reduced during the year	Guaranteed interest for year ended 31 March 2006	Closing balance 31 March 2006	Realised losses not recoverable
		R'000	R'000	R'000	R'000	R'000	R'000	R'000
	Housing							
ABSA Bank		300	273	57	117	-	213	-
Standard Bank		124	105	71	94	-	77	-
First National Bank		126	155	42	82	-	115	-
Nedbank		65	90	61	39	-	112	-
VSB Mutual Bank		19	19	-	-	-	19	-
Total		634	642	225	331	-	541	-

#### **ANNEXURE 4**

#### CAPITAL TANGIBLE ASSET MOVEMENT SCHEDULE FOR THE YEAR ENDED 31 MARCH 2006

	Opening balance	Additions	Disposals	Closing balance
	R'000	R'000	R'000	R'000
MACHINERY AND EQUIPMENT	19,472	2,689	-	22,161
Transport assets	1,883	-	-	I,883
Computer equipment	8,027	2,052	-	10,079
Furniture and Office equipment	8,169	105	-	8,274
Other machinery and equipment	1,393	532	-	1,925
TOTAL CAPITAL ASSETS	19,472	2,689	-	22,161

Opening balance per the asset register of a department on I April 2005. These figures will not agree with the L prior year figures reported in the 2004/05 AFS.

Where a department included assets in the asset register that was owned but only captured during 2005/06, the value is included in the opening balance column

The additions column **only** includes assets that the department purchased or obtained ownership of during the 2005/06 financial year.

- 2 Actual additions per the asset register for the 2005/06 financial year.
- 3 Total disposals per the asset register for the 2005/06 financial year. This is the actual 'cost' of the asset disposed of, i.e. the value of the asset included in the opening balance which is either at RI or the invoice price.
- 4 Per asset register

#### **ANNEXURE 4.1**

#### ADDITIONS MOVEMENT SCHEDULE FOR THE YEAR ENDED 31 MARCH 2006

	Cash In-Kind		Total
	R'000	R'000	R'000
MACHINERY AND EQUIPMENT	2,689	-	2,689
Computer equipment	2,052	-	2,052
Furniture and office equipment	105	-	105
Other machinery and equipment	532	-	532
TOTAL CAPITAL ASSETS	2,689	-	2,689

5 Total cash paid for asset acquired during the 2005/06 financial year.

This column also includes cash paid in an exchange transaction with another government entity, i.e. where computer equipment was donated from another department and a small cash sum was paid to the transferring department.

#### The total should agree to the general ledger - 'PURCHASES OF CAPITAL ASSETS'

- 6 Total spent on own account construction during the 2005/06 financial year.
- 7 The total assets received/donated during the 2005/06 financial year at the value included in the asset register

#### ANNEXURE 4 CAPITAL TANGIBLE ASSET MOVEMENT SCHEDULE FOR THE YEAR ENDED 31 MARCH 2005

	Additions Disposals		Total Movement	
	R'000	R'000	R'000	
MACHINERY AND EQUIPMENT	8,289	8,289		
Transport assets	I,883	I,883		
Computer equipment	1,720	1,720		
Furniture and office equipment	4,019		4,019	
Other machinery and equipment	667		667	
TOTAL CAPITAL ASSETS	8,289	-	8,289	

- 10 Additions per the 2004/05 AFS
- II Disposals per the 2004/05 AFS

#### ANNEXURE 6 INTER-GOVERNMENT RECEIVABLES

	Confirmed balance outstanding		Unconfirmed balance outstanding		TOTAL	
GOVERNMENT ENTITY	31/03/2006	31/03/2005	31/03/2006	31/03/2005	31/03/2006	31/03/2005
	R'000	R'000	R'000	R'000	R'000	R'000
Department						
Department of Defence	-		-	12	-	12
Department of Transport			-	I	-	I
Department of Health			18	37	18	37
Department of Public Works			-	6	-	6
North West Province Department of Education	-	-	-	I	-	I
National Department of Arts and Culture	-	-	26	-	26	-
South African Police Service			I	-	I	-
	-	-	45	57	45	57
Other government entities						
National Research Foundation	-	-	149	149	149	149
		-	149	149	149	149
Total	-	-	194	206	194	206

### ANNEXURE 7 INTER-GOVERNMENT PAYABLES – CURRENT

	Confirmed balance		Unconfirmed balance		TOTAL	
GOVERNMENT ENTITY	31/03/2006	31/03/2005	31/03/2006	31/03/2005	31/03/2006	31/03/2005
	R'000	R'000	R'000	R'000	R'000	R'000
Department						
Current						
South African Police Service	-	5	74	-	74	5
National Department of Health	-	-	-	76	-	76
Department of Transport*	2	-	-	-	2	-
Department of Foreign Affairs*	1,323	-	-	-	1,323	-
Total	1,325	5	74	76	1,399	81
Other government entities						
Current						
National Research Foundation	45	-	-	-	45	-
Total	45	-	-	-	45	-







# Human Resources Oversight Report

### I. Human Resource Management

#### **Public Service Regulations**

The statistics and information published in this part of the annual report are required in terms of Chapter 1, Part III J.3 of the Public Service Regulations, 2002 and have been prescribed by the Minister for the Public Service and Administration for all departments within the public service.

The statistical tables provide high-level information on key human resource issues. The information aims to empower legislatures, the media, the public and other key stakeholders to monitor whether departments are:

- Exercising the powers granted under Public Service and Public Finance legislation in a responsible manner
- Achieving national transformation priorities established by the Cabinet, for example, affirmative action.

Annual reports are produced after the end of the financial year. This is aimed at strengthening the accountability of departments to key stakeholders.

The tables in this report are revised on a regular basis by the Department of Public Service and Administration (DPSA). If you wish to see additional information included in this report, please send suggestions (with a clear motivation) to:

#### The Director-General

Department of Public Service and Administration Attention: Public Service Information Unit P.O. Box 916, Pretoria, 0001 psiu@dpsa.gov.za Fax: (012) 314 7020

To ensure that enough time is available to evaluate and incorporate your suggestions, please ensure that all submissions are submitted on or before 31 August.

For a detailed description and explanation of the terminology used in this section of the report, please consult the publication from DPSA entitled "A guide to understanding the oversight report of departmental annual reports". A copy of this guide is available from all departments or can be accessed from the DPSA website (www.dpsa.gov.za).
TABLE I.I – Personnel costs by programme, 2005/06									
Programme	Total Expenditure	Personnel Expenditure	Training Expenditure	Professional and Special Services	Personnel cost as a percent of total expenditure	Average personnel cost per employee			
	(R'000)	(R'000)	(R'000)	(R'000)		(R'000)			
Corporate Services	97122	2853 I	2163	31766	29.38%	274.34			
Science and Technology Expert Services	36601	15945	117	3857	43.56%	300.85			
International Cooperation and Resources	77636	13412	922	2886	17.28%	279.42			
Frontier Science and Technology	1389346	2387	21	1566	0.17%	238.70			
Government Sector Programmes and Coordination	438048	4849	46	2321	1.11%	285.24			
Total	2038753	65124	3269	42396	3.19%	280.71			

TABLE 1.2 – Personnel costs by salary bands, 2005/06								
Salary bands	Personnel Expenditure	% of total personnel cost	Average personnel cost per employee					
	(R'000)	(R'000)	(R'000)					
Lower skilled (Levels 1-2)	196	0.30%	49					
Skilled (Levels 3-5)	1550	2.38%	74					
Highly skilled production (Levels 6-8)	7939	12.19%	147					
Highly skilled supervision (Levels 9-12)	24895	38.23%	246					
Senior management (Levels 13-16)	30544	46.90%	587					
Total	65124	100.00%	312					

TABLE 1.3 – Salaries, overtime, home	TABLE 1.3 – Salaries, overtime, home owners allowance and medical assistance by programme, 2005/06									
Programme	Sala	ries	Overtime		Overtime Home Owners Allowance		Medical A	ssistance		
	Amount	Salaries as a % of personnel cost	Amount	Overtime as a % of personnel cost	Amount	HOA as a % of personnel cost	Amount	Medical Assistance as a % of personnel cost		
	(R'000)		(R'000)		(R'000)		(R'000)			
Corporate Services	26548	93.05%	750	2.63%	309	1.08%	924	3.24%		
Science and Technology Expert Services	15409	96.64%	10	0.06%	136	0.85%	390	2.45%		
International Cooperation and Resources	12725	94.88%	164	1.22%	165	1.23%	358	2.67%		
Frontier Science and Technology	2285	95.73%	0	0.00%	15	0.63%	87	3.64%		
Government Sector Programmes and Coordination	4628	95.44%	0	0.00%	56	1.15%	165	3.40%		
Total	61595		924		681		1924			

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1

# Human Resources Oversight Report

TABLE 1.4 – Sa	laries, overtime, l	home owners allo	owance and med	ical assistance by	salary bands, 200	5/06		
Programme	Sala	iries	Ove	rtime	Home Owne	Home Owners Allowance		ssistance
	Amount	Salaries as a % of personnel cost	Amount	Overtime as a % of personnel cost	Amount	HOA as a % of personnel cost	Amount	Medical Assistance as a % of personnel cost
	(R'000)		(R'000)		(R'000)		(R'000)	
Lower skilled (Levels 1-2)	93	0.14%	89	0.14%	8	0.01%	6	0.01%
Skilled (Levels 3-5)	1087	1.67%	147	0.23%	108	0.17%	208	0.32%
Highly skilled production (Levels 6-8)	6779	10.41%	262	0.40%	216	0.33%	682	1.05%
Highly skilled supervision (Levels 9-12)	23092	35.46%	426	0.65%	349	0.54%	1028	1.58%
Senior management (Levels 13-16)	30544	46.90%	0	0	0	0.00%	0	0
Total	61595	94.58%	924	1.42%	681	1.05%	1924	2.95%

### 2. Employment and vacancies

The vacancy rate reflects the percentage of posts that are not filled.

TABLE 2.1 – Employment and vacancies by programme, 31 March 200	06			
Programme	Number of posts	Number of posts filled	Vacancy Rate	Number of posts filled additional to the establishment
Corporate Services	138	104	24.64%	-
Science and Technology Expert Services	72	53	26.39%	-
International Cooperation and Resources	53	48	9.43%	-
Frontier Science and Technology	15	10	33.33%	-
Government Sector Programmes and Coordination	22	17	22.73%	-
Total	300	232	22.67%	-

TABLE 2.2 – Employment and vacancies by salary bands, 31 March 20 $$	006			
Salary band	Number of posts	Number of posts filled	Vacancy Rate	Number of posts filled additional to the establishment
Lower skilled (Levels 1-2)	7	4	57.14%	-
Skilled (Levels 3-5)	25	21	84.00%	-
Highly skilled production (Levels 6-8)	81	54	66.67%	-
Highly skilled supervision (Levels 9-12)	118	101	85.59%	-
Senior management (Levels 13-16)	69	52	75.36%	-
Total	300	232		

## 3. Job evaluation

TABLE 3.1 – Job Evaluation, I April 2005 to 31 March 2006								
Salary band	Number of posts	Number of Jobs Evaluated	% of posts evaluated by salary bands	Posts Upgraded		Posts dov	wngraded	
				Number % of posts evaluated		Number	% of posts evaluated	
Lower skilled (Levels I-2)	7	0	0.00%	0	0.00%	0	-	
Skilled (Levels 3-5)	25	8	32.00%	0	0.00%	0	_	
Highly skilled production (Levels 6-8)	81	25	30.86%	0	0.00%	0	_	
Highly skilled supervision (Levels 9-12)	118	8	6.78%	I	12.50%	0	_	
Senior management service band A	48	7	14.58%	0	0.00%	0	_	
Senior management service band B	15	I	6.67%	0	0.00%	0	_	
Senior management service band C	5	0	0.00%	0 0.00%		0	_	
Senior management service band D	I	0	0.00%	0 0.00%		0	_	
Total	300	49	16.33%	0	0.00%		-	

TABLE 3.2 – Profile of employees whose salary positions were upgraded due to their posts being upgraded, I April 2005 to 31 March 2006									
Beneficiaries	African Asian Coloured White Total								
Female	0	I	0	0	I				
Male	0	0	0	0	0				
Total	0	I	0	0	I				
Employees with a disability									

## 4. Employment changes

TABLE 4.1 – Annual turnover rates by salary band for the period 1 April 2005 to 31 March 2006								
Salary Band	Number of employees per band as on I April 2005	Appointments and transfers into the department	Terminations and transfers out of the department	Turnover rate				
Lower skilled (Levels 1-2)	4	3	I	25.00%				
Skilled (Levels 3-5)	20	4	10	50.00%				
Highly skilled production (Levels 6-8)	53	24	14	26.42%				
Highly skilled supervision (Levels 9-12)	85	38	24	28.24%				
Senior management service band A	30	7	5	16.67%				
Senior management service band B	13	4	2	15.38%				
Senior management service band C	3	I	I	33.33%				
Senior management service band D	I	0	I	0.00%				
Total	209	81	58	27.75%				

2

# Human Resources Oversight Report

TABLE 4.2 - Reasons why staff are leaving the department		
Termination Type	Number	% of total
Death	0	0.00%
Resignation	П	18.97%
Expiry of contract	27	46.55%
Dismissal – operational changes	0	0.00%
Dismissal – misconduct	0	0.00%
Dismissal – inefficiency	0	0.00%
Discharged due to ill-health	2	3.45%
Retirement	0	0.00%
Transfers to other public service departments	18	31.03%
Other	0	0.00%
Total	58	
Total number of employees who left as a % of the total employment		25.00%

TABLE 4.3 – Promotions by salary band					
Salary Band	Employees I April 2005	Promotions to another salary level	Salary bands promotions as a % of employees by salary level	Progressions to another notch within a salary level	Notch progressions as a % of employees by salary band
Lower skilled (Levels 1-2)	4	0	0.00%	4	100.00%
Skilled (Levels 3-5)	20	0	0.00%	14	70.00%
Highly skilled production (Levels 6-8)	53	7	13.21%	21	39.62%
Highly skilled supervision (Levels 9-12)	85	8	9.41%	44	51.76%
Senior management (Levels 13-16)	47	14	29.79%	3	6.38%
Total	209	29	13.88%	86	41.15%

### 5. Employment equity

The tables in this section are based on the formats prescribed by the Employment Equity Act, 55 of 1998.

TABLE 5.1 Total number of employees (including employees with disabilities) in each of the following occupational categories as on 31 March 2006								
Occupational categories (SASCO)		Male Female						
	African	Coloured	Indian	White	African	Coloured	Indian	White
Management (Levels 13 – 16)	24	2	6	7	8	I	3	2
Middle management (Levels 9 - 12)	34	2	3	3	43	3	4	8
Administrative (Levels 6 – 8)	13	0	0	2	28	3	0	7
Clerical (Levels 3 – 5)	6	I	0	0	13	I	0	I.
Elementary occupations (Levels 1 – 2)		0	0	0	3	0	0	0
Total	78	5	9	12	95	8	7	18
Employees with disabilities				I	I			

TABLE 5.2 – Total number of employees (including employees with disabilities) in each of the following occupational bands as on 31 March 2006									
Occupational bands		Male				Female			
	African	Coloured	Indian	White	African	Coloured	Indian	White	Total
Top management (Levels 15 – 16)	I	I	I	I	0	I	0	0	5
Senior management (Levels 13 – 14)	23	I	5	6	8		3	2	48
Professionally qualified and experienced specialists and mid-management (Levels $9 - 12$ )	34	2	3	3	43	3	4	8	100
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents (Levels $6-8$ )	13	0	0	2	28	3	0	7	53
Semi-skilled and discretionary decision making (Levels 3 – 5)	6	I	0	0	13	I	0	I	22
Unskilled and defined decision making (Levels $I - 2$ )	I	0	0	0	3	0	0	0	4
Total	78	5	9	12	95	8	7	18	232

TABLE 5.3 – Recruitment for the period I April 2005 to 31 March 2006									
Occupational bands		Male					Female		
	African	Coloured	Indian	White	African	Coloured	Indian	White	Total
Top management (Levels 15 – 16)	0	0	0	I	0	0	0	0	I
Senior management (Levels 13 – 14)	4		2		4			I	11
Professionally qualified and experienced specialists and mid-management (Levels 9 – 12)	15	I	0	I	14	4	0	2	37
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents (Levels $6-8$ )	5	0	0	0	18	0	0	I	24
Semi-skilled and discretionary decision making (Levels $3-5$ )	I	0	0	0	2	I	0	0	4
Unskilled and defined decision making (Levels $I - 2$ )	I	0	0	0	3	0	0	0	4
Total	26	I	2	2	41	5	0	4	81

# Human Resources Oversight Report

TABLE 5.4 – Promotions for the period I April 2005 to 31 March 2006									
Occupational bands		Ma	ale				Female		
	African	Coloured	Indian	White	African	Coloured	Indian	White	Total
Top management (Levels 15 – 16)	I	0	0	0	0	I	0	0	2
Senior management (Levels 13 – 14)	4	0	I	I	4	0	I	I	12
Professionally qualified and experienced specialists and mid-management (Levels $9 - 12$ )	2	0	0	0	3	I	0	2	8
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents (Levels	2	0	0	0	4	0	0	I	7
Semi-skilled and discretionary decision making (Levels 3 – 5)	0	0	0	0	0	0	0	0	0
Unskilled and defined decision making (Levels $I - 2$ )	0	0	0	0	0	0	0	0	0
Total	9	0	I	I	П	2	I	4	29

TABLE 5.5 – Terminations for the period	I April 2005	to 31 Marc	:h 2006						
Occupational bands		Male					Female		
	African	Coloured	Indian	White	African	Coloured	Indian	White	Total
Top management (Levels 15 – 16)	0	0	0	2		0	0	0	2
Senior management (Levels 13 – 14)	2	0	0	0	5	0	0	0	7
Professionally qualified and experienced specialists and mid-management (Levels 9 – 12)	10	0	I	I	8		0	3	24
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents (Levels $6-8$ )	3	0	0	0	10	I	0	0	14
Semi-skilled and discretionary decision making (Levels 3 – 5)	2	0	I	0	5	0	I	I	10
Unskilled and defined decision making (Levels 1 – 2)	0	0	0	0	I	0	0	0	I
Total	17	0	2	3	29	2	I	4	58
Employees with disabilities									

### 6. Performance rewards

TABLE 6.1 – Performance rewards by race, gender, and disability, 1 April 2005 to 31 March 2006								
		Beneficiary Profile		C	ost			
	Number of beneficiaries	Total number of employees in group	% of total within group	Cost	Average cost per employee (R'000)			
African								
Male	27	78	34.62%	258	10			
Female	61	94	64.89%	400	7			
Asian								
Male	4	9	44.44%	68	17			
Female	4	7	57.14%	63	16			
Coloured								
Male	3	5	60.00%	46	15			
Female	7	8	87.50%	57	8			
White								
Male	9	12	75.00%	152	17			
Female	11	18	61.11%	69	6			
Employees with a disability	I	I	100.00%	3	3			
Total	127	232	54.74%	1116	9			

TABLE 6.2 – Performance rewards by salary bands for personnel below Senior Management Service, I April 2005 to 31 March 2006									
Salary Bands		Beneficiary Profile		Cost					
	Number of beneficiaries	Number of employees	% of total within salary bands	Total Cost (R'000)	Average cost per employee	Total cost as a % of the total personnel expenditure			
Lower skilled (Levels 1-2)	2	4	50.00%	8.00	4.00	0.01%			
Skilled (Levels 3-5)	18	21	85.7%	52.00	2.89	0.08%			
Highly skilled production (Levels 6-8)	32	54	59.26%	164.00	5.13	0.25%			
Highly skilled supervision (Levels 9-12)	49	100	49.00%	372.00	7.59	0.57%			
Total	101	179	56.42%	596.00	5.90	0.92%			

TABLE 6.3 – Performance related rewards (cash bonus), by salary band, for senior management service									
		Beneficiary Profile		Cost					
Salary Band	Number of beneficiaries	Number of employees	% of total within band	Total Cost (R'000)	Average cost per employee	Total cost as a % of the total personnel expenditure			
Band A	15	33	45.45%	248	17	0.38%			
Band B	8	14	57.14%	146	18	0.22%			
Band C	2	5	40.00%	70	35	0.11%			
Band D	I	I	100.00%	55	55	0.08%			
Total	26	53	49.06%	519	20	0.80%			

 $\bigcap_{m}$ 

### 7. Leave utilisation for the period | January 2005 to 3| March 2006

The Public Service Commission identified the need for careful monitoring of sick leave within the public service. The following tables provide an indication of the use of sick leave (Table 7.1) and disability leave (Table 7.2). In both cases, the estimated cost of the leave is also provided.

TABLE 7.1 – Sick leave, I January 2005 to 31 March 2006								
Salary Band	Total days	% days with medical certification	Number of Employees using sick leave	% of total employees using sick leave	Average days per employee	Estimated Cost (R'000)		
Lower skilled (Levels 1-2)	24	2.67%	3	75.00%	8.00	3		
Skilled (Levels 3-5)	121	13.44%	16	76.19%	7.56	24		
Highly skilled production (Levels 6-8)	262	29.11%	34	70.83%	7.71	105		
Highly skilled supervision (Levels 9-12)	358	39.78%	48	52.75%	7.46	241		
Senior management (Levels 13-16)	135	15.00%	24	50.00%	5.63	217		
Total	900	20.00%	125	57.08%	7.20	118		

TABLE 7.2 – Disability leave (temporary and permanent), I January 2005 to 31 March 2006

Salary Band	Total days taken	% days with medical certification	Number of Employees using disability leave	% of total employees using disability leave	Average days per employee	Estimated Cost (R'000)
Lower skilled (Levels 1-2)	20	20		0.43%	20	3
Skilled (Levels 3-5)	0	0	0	0.00%	0	0
Highly skilled production (Levels 6-8)	4	4	2	0.86%	2	2
Highly skilled supervision (Levels 9-12)	21	21	3	1.29%	7	16
Senior management (Levels 13-16)	0	0	0	0.00%	0	0
Total	45	45	6	2.59%	7.5	21

Table 7.3 summarises the utilisation of annual leave. The wage agreement concluded with trade unions in the PSCBC in 2000 requires management of annual leave to prevent high levels of accrued leave being paid at the time of termination of service.

TABLE 7.3 – Annual leave, I January 2005 to 31 March 2006								
Lower skilled (Levels 1-2)	36	7.20	5					
Skilled Levels 3-5)	229	9.54	24					
Highly skilled production (Levels 6-8)	394	10.37	38					
Highly skilled supervision (Levels 9-12)	836	11.00	76					
Senior management (Levels 13-16)	490	10.65	46					
Total	1985	10.50	189					

TABLE 7.4 – Capped leave, I January 2005 to 31 March 2006								
Salary Bands	Total days of capped leave taken	Average number of days taken per employee	Average capped leave per employee as at 31 March 2006					
Lower skilled (Levels 1-2)	0	0.00	0					
Skilled Levels 3-5)	0	0.00	23					
Highly skilled production (Levels 6-8)	23	5.75	26					
Highly skilled supervision (Levels 9-12)	27	5.40	39					
Senior management (Levels 13-16)	12	3.00	37					
Total	62	4.72	25					

TABLE 7.5 – Leave payouts for the period I April 2005 to 31 March 2006								
The following table summarises payments made to employees as a result of leave that was not taken.								
Reason	Total Amount (R'000)	Number of Employees	Average payment per employee (R'000)					
Leave payout for 2005/06 due to non-utilisation of leave for the previous cycle	27	3	9					
Capped leave payouts on termination of service for 2005/06	90	2	45					
Current leave payout on termination of service for 2005/06	63	14	5					
Total	180	19	58					

|5|

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