

B U S I N E S S P L A N



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## MANDATE AND VISION

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## MANDATE

**The NRF supports and promotes research through funding, human resource development and by providing the necessary research facilities**

**to facilitate**

**the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge,**

**and thereby contribute**

**to the improvement of the quality of life of all the people of the Republic.**

## VISION

**The NRF aims for a prosperous South Africa and African continent steeped in a knowledge culture, free of widespread diseases and poverty, and proud contributors to the well-being of humanity.**

# Introduction

The National Research Foundation (NRF) is the key public entity responsible for supporting the development of human resource capacity for research, technology and innovation in all fields of science and technology. Within the context of the National Research and Development (R&D) Strategy and New Partnership for Africa's Development (NEPAD) objectives, the NRF is one of the major players in educating and training a new generation of scientists able to deal with South African and African needs. In discharging its mandate, the NRF is guided by corporate core missions and cross-cutting strategic priorities. The adopted core missions and strategic priorities are based on the needs of the National System of Innovation (NSI) and the imperatives outlined in South Africa's National R&D Strategy of 2002.

## 1 NRF corporate core missions and cross-cutting strategic priorities

The four corporate core missions of the NRF are to develop and support:

- High-quality human resources in substantially increased numbers;
- The generation of high-quality knowledge in prioritised areas that address national and continental development needs;
- The utilisation of knowledge, technology transfer and innovation to ensure tangible benefits to society from the knowledge created; and
- The provision of state-of-the-art research infrastructure that is essential to develop high-quality human resources and knowledge.

The six cross-cutting corporate strategic priorities are:

- Redressing inequalities in race and gender;
- Adhering to quality;
- Internationalising research;
- Focusing on Africa;
- Positioning the NRF within the NSI; and
- Transforming the NRF organisationally.

See summary of core missions, strategic priorities and high-level objectives on following page. The rationale for adopting the NRF core mission and strategic priorities is provided in Annexure A (see page 65).

## 2 Key challenges for 2005/06 - 2007/08

The 2005/06 Business Plan builds on the recent efforts of NRF management to redefine, consolidate and align strategies and processes among the Research and Innovation Support and Advancement (RISA), the National Research Facilities which include the National Zoological Gardens (NZG), as well as the South African Agency for Science and Technology Advancement (SAASTA). Although the congruence achieved by focusing corporate efforts around core missions and strategic priorities needs to be sustained, the NRF Business Plan for 2005/06 – 2007/08 outlines focal areas for action to address the escalating challenges in the NSI.

### 2.1 Refocusing: the key driver of the NRF

As one of the key players in the NSI, the NRF focuses on positioning itself squarely in the government's strategy to deliver on the creation of wealth and the improvement of the quality of life. Achievement of these goals in the long run depends critically on highly skilled people who can generate new knowledge, develop and use new technologies, innovate, and drive the competitiveness of the country in international world markets.

Summary of the NRF core missions, strategic priorities and high-level objectives

Core missions	Human Resource Development	Knowledge generation (research and development) in prioritised areas	Utilisation of research results, technology transfer and innovation	Provision of state-of-the-art research equipment infrastructure	
High-level objectives	To stimulate undergraduate and honours students' interest in postgraduate studies	To promote and support knowledge production	To promote utilisation of knowledge, technology transfer and innovation	To provide a research infrastructure	
	To support Master's and PhD student training in higher education				
	R&D staff development				
	To stimulate the interface between science and society				
Performance indicators	<b>Outputs</b>	The expected outputs for RISA and the National Research Facilities differ. Kindly refer to Sections A and B for details.			
	<b>Outcomes</b>	Increased enrolment and completion rates of SET students at honours degree level	Increased number of quality research outputs	Increase in quality patents	Improved quality and quantity of research output
		Increased completion rate of NRF-funded higher degrees, especially doctoral students in prioritised areas	Visibility (of relevance) of RISA-funded research	Increase in knowledge and technology dissemination and uptake	
		New/expanded research activities, in line with national priorities, by staff with improved qualifications			
Increase in number of NRF grantholders with good track record					
<b>Impacts</b>	Growth in the size and quality of human capital for research, technology development and innovation				
	Increased number of doctorates per million population	Increase in global share of relevant knowledge production and exploitation	Greater participation in global knowledge economy	Increased competitiveness	
	Increase in number and quality of R&D staff per million population			Improved rating in UN Technology Achievement Index	
Strategic priorities	Required SET human capital to effect innovation	Societal benefit of research			
	Redress and equity: race, gender, etc.	Adherence to quality	Focus on Africa	Internationalisation of research	Positioning in the NSI
<div style="border: 1px solid black; padding: 5px; margin-top: 10px;">                     Financial perspective                      Business processes and procedures                      Organisational learning and growth                      Human resources and transformation perspective                 </div>					

# Introduction

In view of the importance of human resources for the country, the NRF has identified the following key driver:

## The Key Driver of the NRF

To produce large numbers of high-quality PhDs required to provide the bedrock for an innovative and entrepreneurial knowledge society.

The PhD as the key driver will motivate and underpin the work of all operational units of the NRF. SAASTA, on the one hand, will co-ordinate and establish science outreach programmes at school level, create public awareness of the value of publicly-funded science, and stimulate the interface between science and society. These efforts are designed to translate into a broader base from which tertiary level institutions can draw human resources. On the other hand, the funding programmes of RISA and those managed by RISA, such as the Technology and Human Resources for Industry Programme (THRIP), the DST Centres of Excellence Programme and the Innovation Fund, among others, are designed to increase, deepen and strengthen the pool of researchers, by supporting students and researchers, thereby developing them into established researchers of national and international reknown. The RISA interventions are supplemented by the National Research Facilities through vocational work, research projects and in-service training. These efforts represent a seamless approach that sees human resource development growing from infancy at a schools level into a force in a mature knowledge society with the ability to create economic growth and improve quality of life.

It should be noted, however, that wealth-producing innovation does not occur in a vacuum. While technology plays a vital role in innovation it depends equally on the transformation of people, the way they think, the way they relate to one another and engage with the challenges that a rapidly changing world presents to everyday life. Different fields of knowledge – natural sciences, engineering, social sciences or humanities – all make specific and equally relevant contributions, as do people with the requisite high levels of skill and knowledge. This is why the NRF has identified the promotion of a system of knowledge production that is built on doctoral graduates as being central to making South Africa competitive and innovative. Doctorates are the platform upon which transformation of our knowledge system can commence so that it can make a real difference to the lives of ordinary South Africans. Actions already taken to give effect to the notion of the PhD as key driver of the NRF are, among others, the restructuring of RISA, the increase in the value of PhD bursaries, and the setting of specific targets for the production of PhDs.

## 2.2 Recommitting: service to stakeholders in the NSI

The adoption of the PhD as the key driver implies that the NRF recommits to being an outward-looking stakeholder-sensitive enterprise in the NSI. It demands that the NRF actively engages with all relevant stakeholders. To this end, the NRF has created the New Business Directorate at corporate level and has reconceptualised key functions within RISA.

With quality as a non-negotiable principle, the NRF will give top priority to strengthening the synergies with its line department, the Department of Science and Technology (DST), other government departments (eg, DoE, DoL, **the dti**, etc.), industry, the Higher Education sector, Science Councils, the Higher Education Quality Committee (HEQC), and so forth. A key area for active collaboration is around the changed Higher Education landscape where new strategies are required to effectively service changing needs without compromising previous investments in this area. These and similar initiatives will enable the NRF to grow human resources in a way that creates a more integrated and effective NSI.

## 2.3 Rededicating: support for “Big Science” activities

The NRF will continue to promote the competitive advantage of South and southern Africa for capital-intensive “Big Science” initiatives among the international community of scientists. The decision on the siting of the Square Kilometre Array (SKA) radio telescope will be made in 2007. It is anticipated that the success of the Southern African Large Telescope (SALT) will positively influence the deliberations. Both the African Coelacanth Ecosystems Programme (ACEP) and Inkaba ye Africa (a

multi-institutional German/South African collaborative research programme in the Earth and Space sciences) are evolving into two major internationally co-sponsored flagship programmes of southern Africa. The conceptualisation of the Major Radiation Medicine Centre, using the unique infrastructure and expertise at iThemba LABS that includes a Separated Sector Cyclotron (SSC), is at an advanced stage, and it is anticipated that financing for this ambitious project will be secured during 2005/06. The first of several South African Environmental Observation Network (SAEON) nodes was launched in September 2004. The NRF has been approached officially by the Department of Arts and Culture to assist with the establishment and management of a Human Language Technologies facility. In line with the policy to support "Big Science", the NRF is committed to ensure that South African scientists gain access to major international research facilities.

## 2.4 Redesigning the National Zoological Gardens (NZG)

The strategic planning to redesign the NZG as a National Research Facility, with its huge potential to facilitate the interface between science and society, will be a top priority for the NRF in the 2005/06 financial year. This will include an assessment of the financial and human resource implications of transforming the NZG into a National Research Facility.

## 2.5 Re-emphasising the seamless approach in discharging the NRF mandate

The responsibility of the NRF covers the full range of activities in the research and innovation chain, from building the knowledge base (by developing human resources, generating and using knowledge and providing research facilities) to high value-added research, technology development, innovation and eventual commercialisation. Hence, a major challenge is to identify the synergies between the respective programmes, outreach activities and the provision of "Big Science" infrastructure. The seamless approach to the activities of the NRF has several dimensions:

- To facilitate research and support across the value chain (from fundamental research, to strategic, to applied) for development, application and commercialisation;
- To sensitise researchers to be constantly mindful of national needs and the benefits that their research should bring. The fundamental research supported by the NRF needs to become the incubator of good ideas of the future, and hence lead to a continuous flow of ideas for innovation and application;
- To develop the skills mix required by the nation to produce new knowledge and to innovate. Human resource development and capacity-building in areas of strategic importance are essential as it creates people with the necessary skills to apply and commercialise these ideas on South African soil; and
- To optimise the synergies between the National Research Facilities, targeted funding programmes and networks. All activities and amenities should contribute to the ultimate aim of the NRF's mandate, namely the improved quality of life of all the people of the Republic.

## 2.6 Relooking internal efficiencies

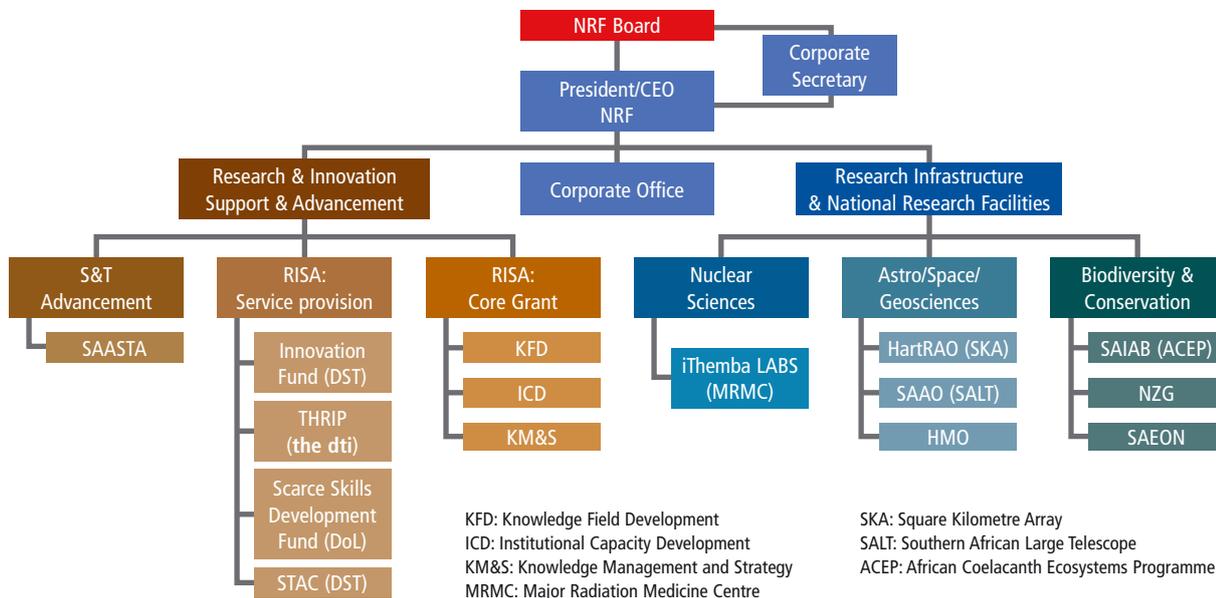
Internal NRF efficiencies are under continuous scrutiny. The institutional five-year review conducted during the 2004/05 financial year – a mandatory exercise for all science councils – will no doubt offer many opportunities for further refinements and enhancements of internal efficiencies and allow the NRF to fully express its purpose in an innovative manner. Also, the implementation of the recommendations emanating from the organisational culture change survey will be accelerated during 2005/06.

The IT section will analyse the bandwidth requirements (especially of the National Research Facilities) and make adequate provision to ensure optimal functionality.

# Introduction

## 3 Clustering of NRF business units and activities

The activities of the NRF are clustered as follows:



### 3.1 Research and Innovation Support and Advancement (RISA)

- Programmes and functions largely supported by the parliamentary core grant;
- Programmes managed by the NRF as a service provider
  - Science and Technology Agreements Committee (STAC), funded by the Department of Science and Technology (DST);
  - Innovation Fund, managed for the Innovation Fund Board of Trustees and funded by the DST;
  - Technology and Human Resources for Industry Programme (THRIP), funded by the Department of Trade and Industry (the dti);
  - Scarce Skills Development Fund of the Department of Labour (DoL); and
- Programmes to facilitate the interface between science and society (SAASTA)
  - SAASTA's main function is to stimulate the interface between science and society and to co-ordinate science and technology (S&T) advancement across the business units of the NRF.

### 3.2 National Research Facilities

The facilities are clustered in terms of the area of knowledge production or of the national need that is being serviced.

#### Astro/Space/Geo Sciences

- South African Astronomical Observatory (SAAO), also responsible for managing the Southern African Large Telescope (SALT);
- Hartebeesthoek Radio Astronomy Observatory (HartRAO); and
- Hermanus Magnetic Observatory (HMO).

#### Biodiversity/Conservation

- South African Institute for Aquatic Biodiversity (SAIAB);
- South African Environmental Observation Network (SAEON), an emerging National Research Facility; and
- The National Zoological Gardens (NZG), which was added to the NRF management portfolio on 1 April 2004.

#### Nuclear Sciences

- iThemba Laboratory for Accelerator Based Sciences (iThemba LABS).

It is evident that the facilities are aligned with the science themes identified in South Africa's National R&D Strategy – such as the Southern Oceans Islands and Antarctic; Bio-resources/sciences; Astronomy and Earth Observation. The National Research Facilities are therefore well positioned to make an impact on the national research and innovation agenda.

## 3.3 Corporate office

- Corporate governance;
- Corporate finance;
- Corporate human resources;
- New business development, including marketing and corporate communication; and
- Corporate performance planning, assessment and benchmarking.

## 4 Budget

### 4.1 NRF budget allocation from the DST for the year ending 31 March 2006: High-level MTEF budget split (R'000)

	TOTAL 2003/04	% Var. 2003/04 vs 2004/05	TOTAL 2004/05	Actual MTEF allocation	Adj. MTEF final 2004/05	% Var. 2004/05 vs 2005/06	MTEF Core 2005/06	% Var. 2005/06 MTEF vs MTEF final	MTEF Final (incl. VAT adj.) 2005/06
<b>RISA Total</b>	<b>258 568</b>	<b>6,56%</b>	<b>275 524</b>	<b>280 734</b>	<b>280 734</b>	<b>6,69%</b>	<b>298 424</b>	<b>0,36%</b>	<b>299 513</b>
RISA Core *	211 628	6,50%	225 384	230 594	230 594	7,67%	245 684	1,05%	248 273
RISA Ring-Fenced	46 940	6,82%	50 140	50 140	50 140	2,19%	52 740	-2,84%	51 240
Laser Loan	3 000	0,00%	3 000	3 000	3 000	0,00%	3 000	0,00%	3 000
KISC	5 000	0,00%	5 000	5 000	5 000	-30,00%	5 000	-30,00%	3 500
SAEON	5 000	0,00%	5 000	5 000	5 000	0,00%	5 000	0,00%	5 000
STAC (incl. IAEA, Norway, IFIP, GBIF, ICGEB)	20 700	15,46%	23 900	23 900	23 900	10,88%	26 500	0,00%	26 500
IKS	10 000	0,00%	10 000	10 000	10 000	0,00%	10 000	0,00%	10 000
SALT	3 000	0,00%	3 000	3 000	3 000	0,00%	3 000	0,00%	3 000
HESS	240	0,00%	240	240	240	0,00%	240	0,00%	240
<b>National Facilities</b>	<b>109 565</b>	<b>12,15%</b>	<b>122 876</b>	<b>118 689</b>	<b>126 666</b>	<b>2,43%</b>	<b>127 207</b>	<b>1,99%</b>	<b>129 742</b>
iThemba LABS *	69 261	12,27%	77 762		77 762	5,94%	80 502	2,33%	82 378
SAAO *	17 478	21,02%	21 152		21 152	3,78%	21 898	0,24%	21 951
HartRAO (2004/05 Incl. R392k for SLRS) *	10 751	10,35%	11 864		11 864	6,47%	12 282	2,84%	12 631
SAIAB (2004/05 Incl. R2,838m for salary and PF deficit) *	7 764	1,11%	7 850		7 850	6,80%	8 127	3,16%	8 384
HMO	4 311	-1,46%	4 248		4 248	3,53%	4 398	0,00%	4 398
iThemba LABS (Adj. for MRMC)			-		2 000	-100,00%	-		
SAIAB (Adj. for Coelacanth Project)			-		1 790	-100,00%	-		
NZG				20 012	20 012	5,95%	21 203	0,00%	21 203
SAASTA *	9 130	19,12%	10 876	9 853	10 876	4,96%	10 450	9,23%	11 415
Centres of Excellence	-	-	-	12 000	12 000	25,00%	15 000	0,00%	15 000
Equipment						100,00%	20 000	0,00%	20 000
SKA (ring-fenced)						100,00%		100,00%	8 000
Pension Fund Deficit						100,00%	14 000	100,00%	14 000
<b>NRF Total (incl. ring-fenced)</b>	<b>377 263</b>	<b>8,49%</b>	<b>409 276</b>	<b>441 288</b>	<b>450 288</b>	<b>15,23%</b>	<b>506 284</b>	<b>2,49%</b>	<b>518 873</b>
<b>NRF Total (excl. ring-fenced)</b>	<b>330 323</b>	<b>8,72%</b>	<b>359 136</b>	<b>391 148</b>	<b>400 148</b>	<b>6,12%</b>	<b>418 544</b>	<b>1,45%</b>	<b>424 633</b>
<b>Baseline adjustment</b>				<b>9 000</b>					
<b>Total MTEF allocation</b>				<b>450 288</b>	<b>450 288</b>		<b>506 284</b>		<b>518 873</b>

\* The VAT adjustment of R6 092 000 for the year 2005/06 has been allocated to the respective facilities.

# Introduction

## 4.2 Three-year MTEF projection (R'000)

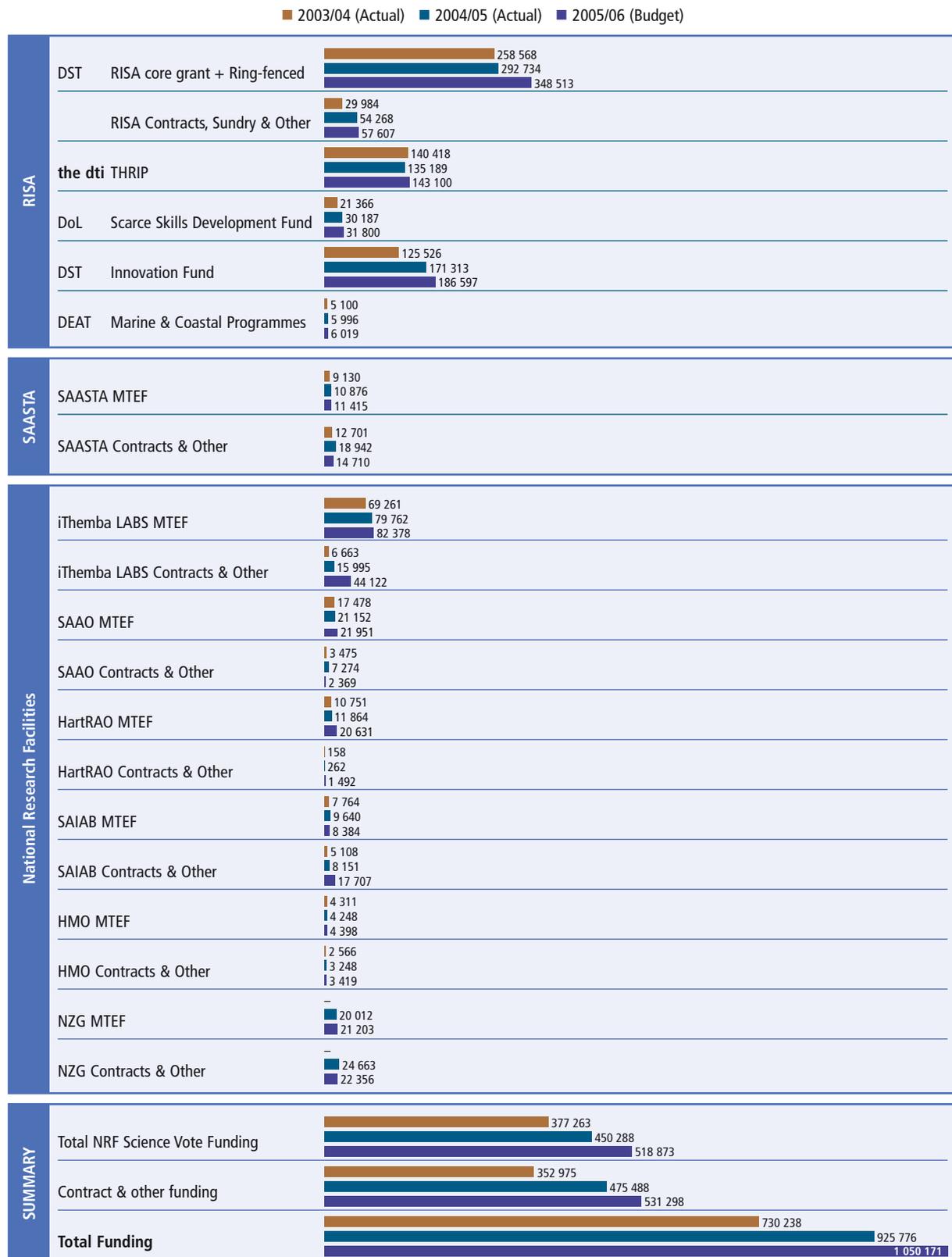
	2005/06	2006/07	2007/08
RISA	250 648	272 215	285 448
SAASTA	11 450	12 287	12 831
Centres of Excellence and Equipment Placement	35 000	35 000	36 750
National Research Facilities	135 204	143 837	151 479
Ring-fenced funding	51 240	54 404	57 199
<b>Subtotal</b>	<b>483 578</b>	<b>517 743</b>	<b>543 705</b>
VAT adjustment	6 092	6 536	6 863
National Zoological Gardens	21 203	22 481	23 606
SKA (ring-fenced)	8 000	8 000	12 000
<b>Total</b>	<b>518 873</b>	<b>554 760</b>	<b>586 174</b>

Included in the NRF allocation is the following ring-fenced allocations (R'000):

Programme	2005/06	2006/07	2007/08
Indigenous Knowledge Systems (IKS)	10 000	10 000	10 000
Laser Loan Programme	3 000	3 000	3 000
Key International Science Capacity	3 500	3 500	3 500
STAC	26 500	29 664	32 459
SAEON	5 000	5 000	5 000
SALT	3 000	3 000	3 000
HESS	240	240	240
<b>Total</b>	<b>51 240</b>	<b>54 404</b>	<b>57 199</b>

## 4.3 Sources of Funding

Figure 1: Comparison of sources of funding (R'000)



# Introduction

## 4.4 Abridged budgeted income statement for the 2005/06 financial year

	RISA	iThemba LABS	SAAO	HartRAO	SAIAB	HMO	SAASTA	NZG	TOTAL NRF		
									Budget 2005/06	% Variance	Actual 2004/05
Core Grant – DST	348 513	82 378	21 951	20 631	8 384	4 398	11 415	21 203	518 873	15,23%	450 288
Contributions & other income	415 123	26 622	2 200	262	17 707	3 155	14 710	26 637	506 416	2,72%	492 988
Projected surplus from previous year	10 000	17 500	169	1 230	–	264	–	(422)	28 741	(48,47%)	55 775
<b>TOTAL INCOME</b>	<b>773 636</b>	<b>126 500</b>	<b>24 320</b>	<b>22 123</b>	<b>26 091</b>	<b>7 817</b>	<b>26 125</b>	<b>47 418</b>	<b>1 054 030</b>	<b>5,50%</b>	<b>999 051</b>
Total Running Expenses	77 271	32 700	10 316	12 796	19 403	3 056	17 466	19 169	192 177	4,79%	183 394
Grants	640 964	–	–	–	–	–	–	–	640 964	5,42%	607 983
Total Running and Grant Expenses	718 235	32 700	10 316	12 796	19 403	3 056	17 466	19 169	833 141	5,28%	791 377
Fixed Assets	300	24 500	(1 300)	88	269	(471)	347	1 752	25 485	(100,00%)	11 162
Salaries	52 101	69 300	15 304	9 239	6 419	5 232	8 313	26 497	192 405	12,10%	171 630
Payment to SALT	3 000	–	–	–	–	–	–	–	3 000	–	–
<b>TOTAL EXPENSES</b>	<b>773 636</b>	<b>126 500</b>	<b>24 320</b>	<b>22 123</b>	<b>26 091</b>	<b>7 817</b>	<b>26 125</b>	<b>47 418</b>	<b>1 054 030</b>	<b>8,20%</b>	<b>974 169</b>
Surplus/(Deficit)	–	–	–	–	–	–	–	–	–	(100,00%)	24 882

Note: The transfer of the NZG to the NRF brings with it some liabilities due to the change in accounting policy for fixed assets and leave gratuity. Discussions with DST as regards the funding of these liabilities are ongoing.

## 5 The structure of the 2005/06 – 2007/08 NRF Business Plan

The 2005/06 – 2007/08 Business Plan reflects the envisaged activities of the main business units of the NRF:

### Section A: Research and Innovation Support and Advancement (RISA)

- Programmes and functions largely supported by the parliamentary core grant;
- Programmes managed by the NRF as a service provider and funded by various government departments; and
- Programmes to facilitate the interface between science and society (SAASTA).

### Section B: National Research Facilities

- Consolidated plan for the National Research Facilities, funded mainly through the parliamentary core grant.

### Section C: Corporate office

- Corporate governance;
- Corporate finance;
- Corporate human resources;
- New business development, including marketing and corporate communication; and
- Corporate performance planning, benchmarking and assessment.

## 1 RISA purpose and framework

The purpose of RISA is to advance the promotion and support of research and research capacity development in all fields of knowledge and technology. This is done by:

- Investing in knowledge, people and infrastructure;
- Promoting basic and applied research and innovation;
- Developing research capacity and advancing equity and redress to unlock the full creative potential of the research community;
- Facilitating strategic partnerships and knowledge networks; and
- Upholding research excellence.

RISA has the following operational approach:

- Programmes and functions largely supported by the parliamentary core grant;
- Programmes managed by the NRF as a service provider:
  - STAC (Science and Technology Agreements Committee) funded by the DST;
  - Innovation Fund managed for the Innovation Fund Board of Trustees and funded by the DST;
  - Technology and Human Resources for Industry Programme (THRIP) funded by the dti;
  - Scarce Skills Development Fund of the DoL; and
- Programmes to facilitate the interface between science and society (SAASTA).

## 2 RISA challenges for 2005 – 2008

### 2.1 Human capital for science and technology

The South African government has set itself the objective of transforming South Africa into a knowledge society that competes effectively in a global system. Such a knowledge society requires educated and appropriately skilled people. Consequently, the production of highly qualified people in sufficient numbers is an essential building block in the modern era.

Much effort has been directed towards ensuring that RISA-supported research is focused on areas that are relevant to the development challenges of South Africa in a rapidly changing, highly competitive, knowledge-driven environment. RISA's efforts to stimulate demand through targeted interventions have borne fruit, but they have not been able to impact meaningfully on the number, quality and composition of researchers, in either demographic or discipline terms.

Several targeted interventions are needed to attract young, black and female researchers into the national research and innovation system, and to retain those who do enter the system. Further, a fresh approach is required to develop partnerships with higher education institutions, enabling the generation of the right levels and spectrum of capacity needed by South Africa in the next half-century.

#### **RISA structural response**

In view of the above challenges, and the key driver of the NRF's activities, namely the production of large numbers of high-quality PhDs required to provide the bedrock for an innovative and entrepreneurial knowledge society, RISA has restructured both at an executive and operational level. The structure will allow RISA to build its activities around the NRF key driver. This restructuring entails:

#### ***Knowledge field development***

An executive post of **Knowledge field development** has been created and mandated to promote new knowledge and research capacity by stimulating and developing the spectrum of knowledge fields. Researchers (as individuals and in their professional and research organisations) will be engaged in this process. Knowledge field development will be achieved by:

# Section A: RISA

- Facilitating the advancement of the frontiers of existing knowledge and expertise;
- Developing new fields of knowledge and the necessary, associated research capacity;
- Promoting active interaction between researchers within and across disciplines and knowledge fields;
- Strengthening scientific and professional organisations of the South African research community;
- Strengthening networking within and beyond the South African research community;
- Investigating and analysing research interests, trends and strengths within and across disciplines and knowledge fields; and
- Refining or redefining research calls in light of the above development incentives.

## ***Institutional capacity development***

Another executive post of **Institutional capacity development** has been created and mandated to promote the capacity of higher education and other research institutions in South Africa to deliver the skills of the quality and quantity required by the national research and development challenges. This will be achieved by engaging institutions in:

- Translating the knowledge needs into the required human capacity;
- Investigating and analysing national and institutional imperatives that impact on the institutional capacity to deliver;
- Leveraging the research and training capacity of Science Councils, government and industry laboratories;
- Facilitating the creation of institutional partnerships to create economies of scale;
- Promoting staff development initiatives at HEIs;
- Facilitating improved throughput rates of postgraduate students;
- Ensuring that infrastructural (research equipment) needs are addressed to meet knowledge and human resource delivery requirements; and
- Refining or redefining research calls for proposals in light of the above development incentives.

## ***Knowledge management and strategy***

The mandate of **Knowledge management and strategy** (KM&S) is to provide policy advice and ensure rational decisions in grants management and administration. Main goals of KM&S are, therefore, to:

- Create and maintain an environment that promotes and supports science intelligence; and
- Identify, optimise and actively manage intellectual assets, either in the form of explicit knowledge (held in artefacts, documents, books, databases) or tacit knowledge possessed by individuals or communities.

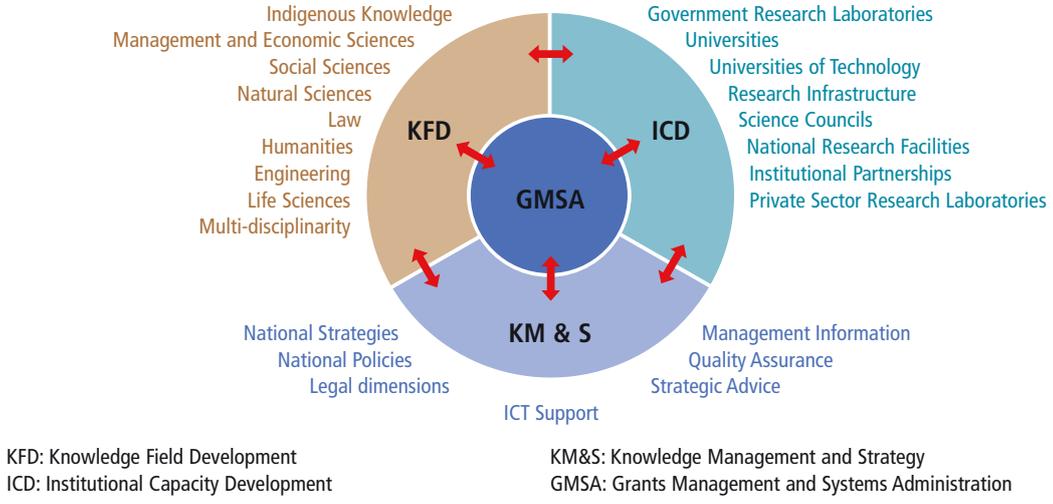
The abovementioned goals are achieved by:

- Implementation and custodianship of knowledge management;
- Information management, services and advice;
- Facilitation of the application of ICT-enabling systems and tools;
- Appraisal, monitoring and evaluation of research outputs of individuals, research proposals and internal or external programmes and initiatives;
- Policy analysis and strategic positioning of the NRF both nationally and internationally; and
- Grants management and systems administration.

A new executive post at assistant director level has been created for **Grants management and systems administration** within the directorate **Knowledge management and strategy** to co-ordinate the diversity of the grant-awarding activities of RISA. This will be achieved by:

- A streamlined granting process involving calls for proposals, peer review processes, awards making and progress monitoring;
- Grant payment processes involving the release and payment of grants, managing claims, auditing expenses and monitoring adherence to grant conditions;
- Liaising on a continuous basis with research institutions and individuals; and
- Creating interfaces with the three RISA directorates: Knowledge field development, Institutional capacity development and Knowledge management and strategy.

Figure 2: Organisational relationship between GMSA and the relevant directorates



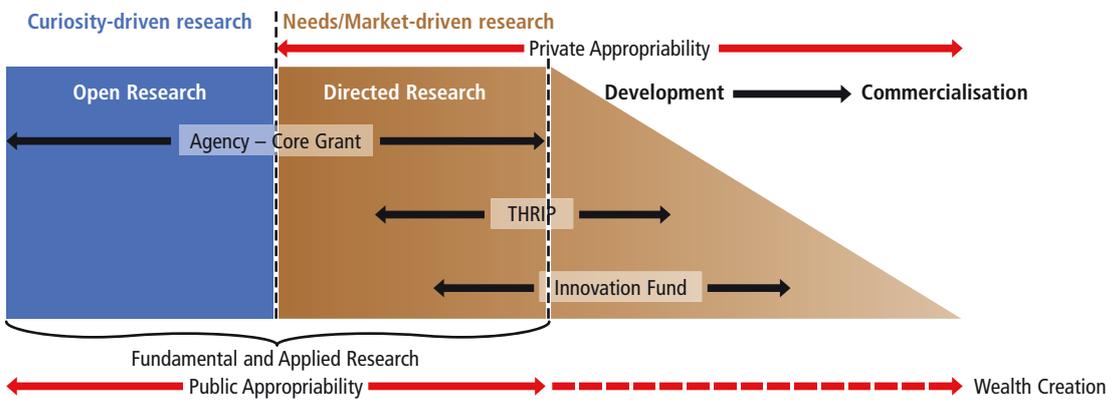
## 2.2 RISA's seamless approach to research support and human resource development

RISA is an agency that covers the full range of activities in the innovation chain, from building the knowledge base (by developing human resources, generating and using knowledge and providing access to research facilities) to high value-added research, technology development, innovation and eventual commercialisation. In addition, the activities of SAASTA are geared to create an interest among learners in science and technology in order to ensure the flow of appropriately qualified learners in sufficient quantities to higher education.

The seamless approach to research funding has several dimensions:

- To facilitate research and support across the value chain (from fundamental research, to strategic, to applied) for development, application and commercialisation; and being mindful of the appropriateness of the funding allocation, particularly under conditions of market failure (see Figure 3);
- To sensitise researchers at the fundamental research end to be constantly aware of how the nation could benefit from their research. The fundamental research support provided by RISA needs to become the incubator of good ideas of the future, and hence lead to a continuous flow of ideas for innovation and application; and
- To develop the skills mix required by the nation to innovate. Human resource development and capacity building in areas of strategic importance are essential as it creates people with the necessary skills to apply knowledge and commercialise technology.

Figure 3: Appropriability of research funding



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## 2.3 Partnerships: service to stakeholders

RISA is mindful of the special needs, requirements and expectations of the funders of special research and human development incentives, such as the DST, the dti and the DoL. Funding from these sources is largely based on initiatives and strategies developed by the funders, sometimes in collaboration with the NRF. Hence, in implementing strategies, a partnership model is adopted with the funders. Such an approach is essential to nurture mutual respect and goodwill, and to build (based on government policies and strategies) strong, long-term relations for the benefit of the science system as a whole. The new corporate post of New Business Development, which includes marketing and corporate communication, should assist greatly in achieving RISA's objectives for partnerships.

## 2.4 Other RISA challenges

In addition to the challenges above, special attention will be given to the following in the next financial year:

- Continuing with the implementation of the National R&D Strategy at all levels, but in particular the strategy for the recapitalisation of research equipment infrastructure, for which R20 million has been earmarked;
- Improving efficiencies and effectiveness in the operational system;
- Developing and implementing new business that will meet demands in support of the PhD as NRF driver;
- Devising a strategy for achieving social equity, especially with regard to entry into the system of knowledge production and human capacity development by African women;
- Fostering research in indigenous knowledge systems;
- Fostering innovation in the broader societal context – a challenge to the social sciences and humanities;
- Proactively engaging Higher Education Institutions in the re-alignment and relevance of support programmes for a changed higher education landscape;
- Ensuring that the new focus and direction translate into the achievement of improved performance in terms of human resources and research; and
- Finalising the design and implementation of the e-granting (NRF on-line) and management information system.

## 3 RISA programmes and functions supported largely by the parliamentary core grant

RISA invests the parliamentary core grant to build the knowledge base mainly through granting. The granting functions centre around nine focus areas, which provide a framework for generating new knowledge and training human resources through research. The focus areas are:

- Unlocking the Future: Advancing and Strengthening Strategic Knowledge;
- Distinct South African Research Opportunities;
- Conservation and Management of Ecosystems and Biodiversity;
- Economic Growth and International Competitiveness;
- Education and the Challenges for Change;
- Indigenous Knowledge Systems;
- Information and Communication Technology and the Information Society in South Africa;
- Socio-political Impact of Globalisation: The Challenge for South Africa; and
- Sustainable Livelihoods: The Eradication of Poverty.

The focus areas form the landscape for interventions designed to cover, on a competitive basis, the entire range of South African research capacity development requirements. These interventions include:

- Free-standing student support (including bursaries for scarce skills provided by the DoL);
- Institutional capacity development programmes for leveraging research capacity in partnership with the diversity of HEIs, Science Councils and government and industry laboratories;
- Development of fields of knowledge generation in partnership with researchers;

- Thuthuka, offering opportunities for researchers-in-training, women in research, and the growth of black research staff (REDIBA);
- The Focus Area Programmes, which provide grants to researchers and grantholder-linked students; and
- The DST Centres of Excellence.

Other granting interventions within the Focus Area framework include:

- Science liaison grants to enable the internationalisation of science (excluding STAC); and
- Equipment and mobility grants.

### 3.1 The contribution of RISA to the NRF core missions

The pages that follow provide a detailed description of how RISA will contribute to the corporate core missions. In terms of the Balanced Scorecard as adapted by the DST, all four core missions address the **stakeholder perspective**.

#### NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

**High-level objective 1:** Stimulate undergraduate and honours students' interest in postgraduate studies

KPI: Attraction and retention of learners in SET through RISA support

Expected outcome: Increased enrolment and completion rates of SET students at honours degree level

Expected impact: Increase in Master's and doctoral enrolments

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Create incentive schemes for SET students	No. of students supported at final year and honours levels in different fields by way of bursaries and assistantships	Total no. supported: 1 263 Final year: 381 Honours: 882	Maintain no. of students supported at different levels Final year: 479 Honours: 961	Increase no. of student assistantships at different levels by 10%	Increase financial support for assistantships by 25%  Increase no. of assistantships at final year and honours levels by 10% per annum

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## NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

### High-level objective 2: Support for Master's and PhD student training in higher education

KPI: Effective and efficient support for Master's and doctoral students

Expected outcome: Increased completion rate of NRF-funded higher degrees, especially doctoral students in prioritised areas

Expected impact: Increased number of doctorates per million population

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Support for Master's and doctoral students	No. and value of Master's and doctoral bursaries (free-standing and grantholder-linked)	Total supported: 3 141 Master's: 2 069 Doctoral: 1 072	Increased no. of students Master's: 2 172 Doctoral: 1 206	Maintain no. of students supported at 2004/05 levels  Increase value of all full-time doctoral bursaries by an additional R5 000 to R35 000	Increase no. of students by 20% per annum  Increase bursary values: Master's: R35 000 Doctoral: R50 000
Promote in-service doctorates in different sectors, including industry, science councils, government, NGOs, etc.	No. of part-time students enrolled  Partnerships forged within different sectors	N/A	Assess potential of this kind of intervention	Develop relationship with different sectors and formulate strategy	Implement strategy
Embedding students in different sectors, including industry, science councils, government, NGOs, etc.	No. of full-time students enrolled who spend time in different sectors under co-supervision	N/A	Assess potential of the proposed intervention	Involve 30 Master's and PhD students	Increase no. of students by 100%
Promote HEI staff enrolment in Master's and doctoral studies	No. of staff development grants	Staff enrolment: 143 Master's: 52 Doctoral studies: 91	Total enrolment: 135 Master's: 63 Doctoral: 72	Increase enrolment and completion rates by 10% per annum	Increase enrolment and completion rates by 10% per annum
Support HEI staff mentoring and supervision activities	No. of staff benefiting from staff mentoring pilot programme	Launch and pilot NRF Institutional mentoring and supervision programme	5 HEI mentoring sites	11 HEI mentoring sites	All HEIs to be mentoring sites

## NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

### High-level objective 3: R&D staff development

KPI: Effectiveness of postdoctoral R&D staff development

Expected outcomes: New/expanded research activities, in line with national priorities, by staff with improved qualifications

Increase in number of NRF grantholders with good track records

Expected impact: Increase in number and quality of R&D staff per million population

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Support for postdoctoral fellows	No. of postdoctoral fellows	No. of postdoctoral fellows supported: 172	No. of postdoctoral fellows supported: 216	Maintain no. of postdoctoral fellows at 2004/05 level	Increase by 10% per annum
	Value of support	Value of grantholder-linked bursaries R40 000	Increased value of grantholder-linked bursaries from R40 000 to R60 000	Maintain value of postdoctoral support at R60 000	Increase value to R120 000 per annum
Expand and strengthen grantholder community	No. of grantholders by discipline and fields	No. of grantholders supported: 1 327	Increased no. of grantholders to 1 500 at constant average grant value	Grow no. of grantholders in all fields by 10% on 2004/05 performance	Increase no. of grantholders in all fields of science by 10% per annum
	No. of rated researchers produced through research capacity development (RCD) interventions	Rated researchers in the RCD programmes: 83	Increased no. of rated researchers in RCD programmes to 92	Increase rated researchers from RCD programmes to 110	Increase by 10% per annum
	Proportion of rated grantholders of total	Total no. of rated researchers: 606	Information to be provided by end of financial year	Increase on 2004/05 proportion	Increase proportion by 10% per annum

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## NRF CORE MISSION 2: KNOWLEDGE GENERATION (RESEARCH AND DEVELOPMENT) IN PRIORITISED AREAS

**High-level objective:** Promote and support knowledge production

**KPI:** Quantity, quality and relevance of knowledge production

**Expected outcomes:** Increased number of quality research outputs  
Visibility (of relevance) of RISA-funded research

**Expected impacts:** Increase in global share of relevant knowledge production and exploitation  
Societal benefit of research

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Invest through Focus Areas in relevant research (basic and applied) for future application and innovation*	Investment per priority area/Focus Area	Total investment of R126,7m	Increased level of investment through funding of Focus Areas to R221,7m	Increase level of investment through funding of Focus Areas to R266m	Increase investment in Focus Area research by 10% per annum
	Support to different science and knowledge domains (see notes below**)	25% of total to SSH grants	Analyse and assess funding to different science and knowledge domains: 19% to SSH and Law	25% of total to SSH grants	30% of total to SSH grants
	No. of refereed journal publications (aligned to DoE requirements) in all programmes	Research output of RISA-funded researchers in all programmes: Peer-reviewed journal publications: 2 476	Information to be available on receipt of progress reports of grantholders	2 700 peer-reviewed articles	Increase by 10% per annum
Increase knowledge production through international collaborations	No. of grants awarded through RISA-supported bi-lateral co-operation	N/A	Obtain baseline information: assess current incentives for collaboration and formulate recommendations	100 grants to be awarded	Implement improved measures to stimulate collaboration
Ensure accelerated knowledge production through CoEs	No. of CoEs Support for the development of CoEs within different science and technology fields	Development of CoEs	Established six CoEs	Establish one additional CoE	Establish 10 more CoEs
Support development of institutional research culture through the institutional programmes	No. and nature of relevant niche areas supported	22 niche areas approved	A total of 73 niche areas were established to date	Retain no. of niche areas Develop and pilot framework for institutional capacity development	Implement framework
Support development of individuals (Thuthuka)	No. of Thuthuka grantholders (women and black researchers)	No. of grants made: 170	Increased no. of Thuthuka grants to 292	Total number of grants: 430, of which 150 should be to new grantholders	Increase numbers by 10% per annum
	Annual funding leveraged as co-investment from institutions			A total amount of R35m should be leveraged	Grow co-investment leveraged from institutions by 10%

\* Innovation as defined in a wider societal context.

\*\* The support for multi-disciplinary, problem-oriented research requires interface between the different science domains and scientists who are competent to contribute to solutions from their respective fields of expertise. Few scientists in the Social Sciences, Humanities (SSH) and Law access NRF grants and a special intervention has been implemented (Shifting the Boundaries) to stimulate awareness of possible interfaces and to explore the contribution that SSH and Law can make to specific problems.

## MISSION 3: UTILISATION OF RESEARCH RESULTS, TECHNOLOGY TRANSFER AND INNOVATION\*

**High-level objective:** Stimulate the use of publicly funded research and technology development

**KPI:** Usefulness of knowledge produced

**Expected outcomes:** Increase in quality patents  
Increase in knowledge and technology dissemination and uptake

**Expected impact:** Greater participation in global knowledge economy

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Movement of RISA-funded grantholders to THRIP and Innovation Fund	No. of RISA-funded grantholders that are successful in THRIP and Innovation Fund applications	N/A	Establish baseline	Report on baseline and plan for improvements	Increase on baseline
Uptake of students funded through the RISA core grant into the labour market, eg, no. of students taken up in industry, business, research councils, government	Have data available	N/A	N/A	Negotiate with DST, HSRC and SAQA around accessing information	Formulate policies and programmatic interventions based on information
Protection of intellectual property (IPR)	No. of patents filed	Filed: 14	Retain level of performance	Retain level of performance	Increase no. of patents
	No. of patents awarded	Awarded: 27	Establish IPR assistance strategy	Utilise IFCO capacity	Utilise IFCO capacity
RISA-driven knowledge/ technology diffusion and dissemination	Narrative on projects commercialised and/ or used for societal benefit, policy inputs, etc	Identified and diffused information about certain projects	Revise and improve on strategy	Active communication around projects	Increase awareness of projects utilised for commercial and societal benefit
	No. and nature of workshops, seminars and scientific meetings facilitated by RISA	N/A	Provide baseline information	Increase numbers Deepen/broaden debate	Increase numbers Deepen/broaden debate
RISA-supported knowledge diffusion	No. of conferences attended by grantholders	N/A	Improve on baseline information	Increase diffusion through conferences	Increase diffusion through conferences
	Amount spent on conference support by RISA – National – International – Africa	N/A	Improve on baseline information	Increase value	Increase value

\* Innovation as defined in a wider societal context.

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## MISSION 4: HIGH-QUALITY INFRASTRUCTURE

**KPI:** Effective provision of research infrastructure and electronic services in prioritised areas

Expected outcome: Improved quality and quantity of research output

Expected impacts: Increased competitiveness

Improved rating in UN Technology Achievement Index

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Growth of databases for knowledge production	No. of meta-data descriptions of research projects added	Added 6 000 records of current and completed research projects to Nexus database	Improve on indicator data to provide information on growth in use of databases	Useful report on utilisation of databases	Increase in information providers  Increase use of data sets
Research equipment acquisition and renewal	Appropriate provision of research infrastructure	Development of national equipment renewal strategy	Finalised the national equipment renewal strategy	Implementation of equipment renewal strategy	R100m per annum for equipment renewal in HEIs and SCs
		Allocation of R11,7m for research equipment		Strive to make R20m available for research equipment	
Providing access to equipment	No. of mobility grants	41 grants	79 grants	100 grants	Grow by 10% annually
	Funds for mobility grants	R654 000 allocated	R1,239m allocated	Provide (through savings) funds for mobility grants to the amount of R1,5m	Grow amount available to address demand to R5m per annum

## 3.2 The contribution of RISA to the NRF cross-cutting strategic priorities

This section provides a detailed description of how RISA will contribute to the cross-cutting strategic priorities of the NRF. In terms of the Balanced Scorecard, as adapted by the DST, all strategic priorities (with the exception of organisational transformation) address the stakeholder perspective.

### STRATEGIC PRIORITY 1: RACE AND GENDER EQUITY AND REDRESS

This section highlights interventions aimed specifically to attain race and gender equity in Core Mission 1: Human resource development.

KPI: Participation of black and women researchers in RISA activities  
 Expected outcome: Increased participation rates of students and new, young or historically disadvantaged researchers  
 Expected impact: Increased research outputs by black, women and young researchers

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Stimulate undergraduate students' interest in postgraduate studies	Black students as % of totals reflected under Mission 1: High-level objective 1	Decrease in black final year students from 98% (250/255) of total in 2002/03 to 94% (359/381) in 2003/04	93% (446/479)	Increase to 94%	Maintain % of black final year students
		Decrease in black honours students from 78,5% (639/813) in 2002/03 to 77% of total (677/882) in 2003/04	Increased black honours students from 78,5% to 82% of total	Increase to 83%	Increase black honours students to 85% of total
Support for Master's and doctoral students in HEIs	Black and women students as % of totals reflected under Mission 1: High-level objective 2	Decrease in % of black Master's students from 52,4% (1 145/2 181) of total in 2002/03 to 51,2% (1 061/2 069) of total Master's students in 2003/04	Black Master's students decreased to 51%	Increase to 53% of total	Increase % of Master's students to 60% of total
		Increased women Master's students from 48,7% (1 064/2 181) of total to 50% (1 017/2 069) of total	Increased women Master's students from 49% of total to 51% of total (1 100/2 172)	Increase to 53% of total	Increase % of women Master's students to 55% of total
		Increased % of black doctoral students from 45% (435/967) of total to 48% (514/1 072) of total doctoral students	Maintained % black doctoral students at 48% of total (583/1 206)	Increase to 50% of total	Increase % of black doctoral students to 55% of total
		Maintained women doctoral students at 42% (408/967) of total doctoral students in 2002/03 and 42% (452/1 072) of total doctoral students in 2003/04	Increased % women doctoral students from 42% to 43% of total (515/1 206)	Increase to 45%	Increase to 50%

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## STRATEGIC PRIORITY 1: RACE AND GENDER EQUITY AND REDRESS (CONT.)

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Support for postdoctoral R&D staff development	Blacks and women as % of totals reflected under Mission 1: High-level objective 3	Decrease in % black postdoctoral fellows from 39% (45/114) to 31% (53/172) of total	Decrease in black postdoctoral fellows from 39% to 37% of total (80/216)	Increase black doctoral fellows to 40% of total	Increase black postdoctoral fellows to 60% of total
		Decrease in % women postdoctoral fellows from 34% (39/114) to 30% (52/172) of total	Increased women postdoctoral fellows from 34% to 35% of total (75/216)	Increase women postdoctoral fellows to 40% of total	Increase women postdoctoral fellows to 50% of total
Knowledge production	No. of black and women researchers as % of total reflected under Mission 2	Increased % black grantholders from 22% (308/1 375) to 26% (339/1 327) of total	Increased to 27% of total (403/1 500)	Increase to 30% of total	Increase by 5% of total per annum
		Increase % women grantholders from 24% (331/1 375) to 30% (402/1 327)	Increased to 34% of total (514/1 500)	Increase to 38% of total	Increase by 5% per annum
Quality of knowledge production	Blacks and women as % of rated researchers as reflected in Strategic Priority 2: Adherence to quality	Maintained no. of rated black researchers at 11% (84/707) in 2002/03 and 11% (77/689) of total rated researchers	Increased no. of rated black researchers to 20% of total rated researchers	Increase no. of rated black researchers to 30% of total rated researchers	Increase no. of rated black researchers to 10% per annum of total rated researchers
		Increased rated women researchers from 15% (108/707) in 2002/03 to 18% (125/689) of total rated researchers	Increased no. of rated women researchers to 20% of total rated researchers	Increase no. of rated women researchers to 30% of total rated researchers	Increase no. of rated women researchers to 10% per annum of total rated researchers
		Decrease in black rated researchers as % of total grantholders from 6,1% (84/1 375) in 2002/03 to 5,8% (77/1 327) in 2003/04	Increased no. of rated black researchers to previous level of 6% of total grantholders (93/1 500)	Increase no. of rated black researchers to 7% of total grantholders	Increased no. of rated black researchers to 10% per annum of total grantholders
		Increase in rated women researchers as % of total grantholders from 6,6% (91/1 375) in 2002/03 to 8,4% (112/1 327) in 2003/04	Increased no. of rated women researchers to 10% of total grantholders (144/1 500)	Increase no. of rated women researchers to 12% of total grantholders	Increase no. of rated women researchers to 15% per annum of total grantholders
Addressing social equity	Programmatic interventions to address inequities, especially entry into system	N/A	N/A	Develop strategy for realistic equity targets	Implement strategy

## STRATEGIC PRIORITY 2: ADHERENCE TO QUALITY

Adherence to quality is facilitated by assessing:

- Research output, resulting in the rating of individuals and in accordance with the quality measures for publication output;
- Periodic independent review of RISA programmes and National Research Facilities individually and of the NRF collectively;
- Evaluation of research niche areas; and
- Evaluation of research proposals and projects for CoEs.

KPI: Internationally benchmarked assessment of quality

Expected outcomes: Number of rated researchers with benchmarked research outputs

A progressive system that allows for capacity development and improvement over time

Expected impact: Improved competitiveness

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Evaluation to support decision-making	No. of evaluations and ratings of individuals completed	353 evaluations and ratings of individuals completed	324 evaluations and ratings of individuals received, and 257 completed	Grow total no. of evaluations for rating by 5%	Grow total no. of evaluations for rating by 5%
	No. of research niche areas evaluated in Institutional Programmes	62 research niche areas evaluated in Institutional Programmes	10 assessment panel meetings held	Design and pilot quality measures in Institutional Programmes	Implement quality measures
	No. of new research proposals received in Focus Areas	597 received; 81% success rate	821 received; 61% success rate	Increase no. of new research proposals by 5%	Grow total no. of new proposals by 5%
	Improve methods of peer review and decision-making tools	N/A	N/A	Development of MCDM	Continuous improvement of systems
	Programme evaluations	N/A	Completed evaluations of iThemba LABS, SAIAB, IKS, Innovation Fund's Focus Areas, and the NRF Institutional Review	Implement evaluation recommendations Evaluate STAC Evaluation of Sea and Coast Programme	Strategically planned programme evaluations

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## STRATEGIC PRIORITY 3: INTERNATIONALISATION

The goal of becoming globally competitive requires that professionals and researchers collaborate with the best in the world. This collaboration will enhance knowledge transfer and the sharing of expertise, improve knowledge production, as well as offer opportunities to train research students.

KPI:	Internationalisation of South African science
Expected outcome:	Increasing opportunities for constructive international collaboration with tangible research results and human capacity development
Expected impact:	International recognition for South African science and scientists

### Performance measure and targets:

A new vision will be formulated for leveraging international capacity to build South Africa's R&D capacity. In the short term, the strategy will be designed and tested within the research community, for implementation in the longer term. It will be expected of all RISA funding programmes to indicate their contribution to the internationalisation in all knowledge domains.

Several other initiatives in internationalising South African science are vested within granting programmes and other sections of RISA and will be continued in 2005. These include:

- Inkaba ye Africa, a multi-institutional German/South African collaborative research programme in the Earth and Space Sciences;
- The Royal Society/NRF programme which has received approval for continued funding for a second cycle;
- Continued support to the steering committee of the International Group of Funding Agencies for Global Change Research (IGFA);
- Support to the International Council for Science (ICSU) African regional office at the NRF in Pretoria;
- Implementation of newly identified ICSU priority areas; and
- National Science Foundation/NRF collaboration in science education research, with involvement of other partners in the UK and Australia.

In order to expand appropriate international linkages and networks in support of this strategic priority, RISA will liaise closely with the Executive Director of New Business Development and his staff in the Corporate office.

### Budget:

An amount of R10,9 million is allocated for the internationalisation of science during 2005/06.

## STRATEGIC PRIORITY 4: FOCUS ON AFRICA

South Africa is a major player and driver of NEPAD. For NEPAD to become real and meaningful there is a need to accelerate the development of research collaborations between South African scientists and those from the rest of Africa. The focus on Africa will enrich and strengthen the research base in South Africa as well as on the rest of the African continent.

In the short term, the NRF will fund collaborative activities between South African scientists and scientists from Africa. In the longer term, however, there will be a more focused strategy to leverage and benefit from international capacity, thereby building on the competitive advantages of R&D in the region.

NEPAD can enable the NRF to achieve the following:

- Build capacity on a broad front;
- Exploit mutually competitive advantages, particularly with respect to natural resources and spatial development initiatives;
- Advance and benefit mutually from indigenous knowledge systems; and
- Share essential facilities for research.

KPI:	Interaction with Africa
Expected outcome:	Increasing number and significance of collaborative research programmes and networks within SADC and NEPAD context
Expected impact:	A shared and developing African-based system of knowledge generation and application, optimising Africa's competitive advantages

Performance measures and targets:

- Develop two African research networks in collaboration with new ICSU office, for example the African network on global climate change; and
- Develop five bi-national programmes with African countries in support of the NEPAD science platforms.

### Budget:

The interaction with research communities in Africa will be funded through all funding programmes of RISA. In addition, an earmarked budget of R1,5 million is provided for these activities.

# Section A: RISA

## STRATEGIC PRIORITY 5: POSITIONING THE NRF

As a key player in the NSI, the NRF strives to:

- become a knowledge organisation with a clear understanding of the critical elements of the innovation cycle and their interrelationships;
- move much closer to the stakeholders within the NSI, such as government departments with mission-driven research agendas, business, science councils, higher education and NGOs, in order to understand and respond to their needs, and alert them to the NRF mandate and the competencies and facilities that are at their disposal;
- promote the competitive advantage of South and southern Africa for capital-intensive “Big Science” initiatives among the international community of scientists; and thereby
- grow the financial resource base for discharging the mandate in partnership with these stakeholders.

KPI: Provision of relevant service to stakeholders within the NSI  
 Expected outcome: Increased use by stakeholders of RISA services across the spectrum of innovation  
 Increase in resources for R&D within RISA  
 Expected impact: A more integrated and effective NSI

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target 2006-08
Providing direction within the NSI	Benchmarking studies and policy and programmatic interventions	N/A	Continued with the Shifting the Boundaries Project	Produce reports Develop programme interventions	Systematic development of knowledge fields
			Completed the evaluation of the following Focus Areas: – ICT – Globalisation – IKS/Science interface	Implementation of review recommendations regarding the three evaluated Focus Areas	Monitor influence of Focus Area within national context
Growing the business of RISA	Increase resources channelled through RISA	Parliamentary core grant: R211,6m	Parliamentary core grant: R230,6m	Parliamentary core grant: R248,2m	Grow total by a further R50m per annum
		Increased mission-driven funding	DST: R32,6m Including: – CoE – SABI – SABIF – SANAP – PAST – Year of Physics – Internships DoL: R29,5m the dti: R139,0m	DST: R49m Including: – CoE – Equipment	DST: R190m
Facilitate the re-alignment of the Postgraduate Qualifications Framework	Duration of four-year postgraduate training for attaining both Master’s and PhD	N/A	N/A	Policy discussions with stakeholders such as DoE and NSFAS  Continued lobbying to raise awareness among stakeholders	Phase out honours bursaries in accordance with new Postgraduate Qualifications Framework

## 4 Programmes managed by RISA as service provider

### 4.1 Overview

The NRF as agency has recognised management and administrative competencies that allow research development funders to use the NRF as preferred service provider. Usually, the funder and the NRF enter into a longer-term Memorandum of Understanding (MoU) and/or Service Level Agreement (SLA), which outlines the management strategy and objectives of the programme.

Services are only rendered to programmes that:

- fall within the ambit of the NRF mandate;
- support the core missions and strategic priorities of the NRF;
- contribute in one way or another to, or benefit from, the production of PhDs as key driver of the NRF; and
- deliver the human resources and knowledge on which an innovative and entrepreneurial knowledge society is built.

RISA as service provider offers the following management and administration skills to programmes governed by MoUs or SLAs:

- Developing and refining appropriate MoUs or SLAs;
- Establishing management and administrative structures and procedures to comply with legislation and regulations;
- Adhering to appropriate planning, monitoring and reporting procedures and timeframes;
- Providing sound financial management skills, support (internal and external audits) and timeframes for submission of budgets and financial statements;
- Ensuring sound investment decisions through evaluation procedures;
- Maintaining high standards in business processes and procedures according to predetermined payment schedules by funders/sponsors;
- Ensuring customer satisfaction through improved service and communication;
- Implementing outcomes-based management by designing performance indicators and measurements for the delivery of key results; and
- Providing key infrastructural support (such as human resources and IT).

The RISA business plans for the programmes it manages as service provider focus only on the improvement of the generic management/administrative competencies listed above. Detailed business plans on the objectives to be achieved by these programmes are submitted separately to the respective bodies governing the programmes.

A short overview of the programmes currently managed by RISA as service provider follows.

### 4.2 Science and Technology Agreements Committee (STAC)

South Africa's re-entry into the international arena of S&T (and research) collaboration in the post-1994 period has resulted in a number of bilateral and multilateral agreements. The STAC committee was convened during the first quarter of 1996 by the then Department of Arts, Culture, Science & Technology (DACST) and tasked with policy development, direction and advice for, and overseeing, all multilateral and bilateral activities for the Department. The committee met twice a year, was chaired by the Deputy Director-General, and included representation by each of the Science Councils and several sister government departments. In February 2000, the Director-General of DACST approved a manual on the policies, processes, procedures, management and administration related to DST's international obligations.

STAC requested the then Foundation for Research Development (FRD) to take responsibility for the management and administration of STAC-related activities, grants and overseeing of projects, as the Department had neither the infrastructure nor the expertise to do so.

DST retains the responsibility for negotiating bilateral or multilateral agreements with international partners, drafting Framework Programmes of Action (which detail priority setting, conditions and criteria) and negotiating funding levels for each agreement. These agreements serve to develop scientific relations between the research communities of the inter-governmental signatories

# Section A: RISA

and to establish long-term, sustainable scientific co-operation and developing networks. The main purpose of the co-operative research is to support projects of scientific excellence, by promoting the exchange of researchers and stimulating interaction between the two scientific communities. Co-operative research projects also contribute, through research, to the development of the scientific communities in both countries. Emphasis is placed on training, and the inclusion of PhD students and exchange of postdoctoral fellows within approved projects is encouraged.

## Challenges for 2005/06

During 2005, the Swiss National Science Foundation bilateral agreement activities and funds will be transferred to STAC. Also, the support for activities within the IBSA (India, Brazil and South Africa) agreement will be launched. The co-operation within the European Union (EU) Framework will continue through marketing and workshops around the EU research platforms.

## Budget

The 2004 STAC budget of R23,9 million will increase to R26,5 million for 2005/06.

## 4.3 Innovation Fund

The Innovation Fund (IF), a policy instrument of the DST, was created to promote:

- Technological innovation;
- Increased networking and cross-sectoral collaboration; and
- The key issues of
  - competitiveness;
  - quality of life;
  - environmental sustainability;
  - the harnessing of information technology.

The NRF manages the Innovation Fund on behalf of the Innovation Fund Board of Trustees.

The Fund's strategic objectives include:

- Creating a knowledge base in key technology and economic sectors;
- Facilitating the exploitation and commercialisation of R&D results from the existing knowledge base;
- Investing in technological innovations that will benefit South Africa;
- Supporting historically disadvantaged individuals in terms of infrastructure, knowledge and technology transfer;
- Enabling the expansion and migration of existing industries to new value-added areas;
- Enabling the establishment of R&D-intensive industries; and
- Fostering the establishment of technology-based small enterprises and ensuring their growth through a variety of support mechanisms.

The Innovation Fund's five-year strategic plan was approved by the Fund's Board of Trustees on 2 December 2002. The plan was based on the National R&D Strategy and a programme evaluation report, which informed the strategic and operational direction of the Fund. A series of new initiatives has been proposed that seek to enhance innovation in South Africa. These funding initiatives are:

- Technology missions: to support the development of long-term, high-risk, market-driven, enabling technology that will benefit an existing economic sector;
- Technology advancement programme: to promote innovation in new technology frontiers;
- Various competitive initiatives:
  - To promote entrepreneurship through the commercialisation of the innovative ideas of young entrepreneurs; and
  - To promote R&D collaboration and entrepreneurship within the business and research community, emphasising networking among different racial groups and across cultures;
- Innovation Fund Commercialisation Office (IFCO): to offer a comprehensive service with respect to patent applications

and technology transfer for publicly funded research;

- Seed and start-up financing: to finance the development of a product or prototype, proof of concept and initial marketing.

#### Challenges for 2005/06 and in the longer term

- Establishing appropriate performance indicators for the Innovation Fund in view of several new developments;
- Formalising a Service Level Agreement;
- Streamlining business processes for the open call application system;
- Capacitating the Innovation Fund Commercialisation Office in accordance with the strategy;
- Entrenching the Near Market Opportunities joint programme with the Focus Area Programmes to create a seamlessness in grant funding across the innovation chain;
- Implementing audit recommendations;
- Increasing awareness of the Fund through marketing campaigns;
- Establishing the return on investment of previous funding rounds; and
- Refining the Innovation Fund areas of focus.

#### Budget

The Innovation Fund's budget of R171 million in 2004/05 will increase to R182 million in 2005/06. The NRF claims a management and administration fee from the allocated budget for various support services rendered.

#### 4.4 THRIP

The Technology and Human Resources for Industry Programme (THRIP) is managed by the NRF, advised by the THRIP Board and sponsored by **the dti**. The programme supports projects that address the technology and human resources needs of industry on a cost-sharing basis with industrial partners.

During 2005/06 THRIP will be implementing recommendations made in the new five-year strategic plan approved by **the dti**. In so doing, the programme is better aligned to key strategies that government uses to guide research and development, increase competitiveness, grow the economy, create jobs, eradicate poverty and provide equity within South Africa. The THRIP business plan is shaped largely by these strategies and focuses heavily on communication and engagement campaigns with stakeholders to grow the programme. There will also be a strong focus on monitoring and mentoring to broaden participation and ensure customer retention.

#### Challenges for 2005/06 and in the longer term

- Equity in participation with the aim to:
  - increase participation in THRIP by SMMEs (small, medium and micro enterprises);
  - get Black Economic Empowerment (BEE) participation in THRIP;
  - improve the number of black and women researchers in THRIP;
  - increase the number of black and women students participating in THRIP; and
  - increase the share of THRIP budget allocation to HDIs and Technikons/Universities of Technology.
- THRIP will embark on a vigorous advertising and marketing campaign targeted at industry in general, and specifically at small and medium industries.
- Other challenges include implementation of interventions to reduce the amount of unspent funds returned to **the dti** at the end of each financial year.

#### Budget

The MTEF budget allocation for THRIP will increase from R135 million for 2004/05 to R143 million for 2005/06. The NRF claims a management and administration fee from the allocated budget for various support services rendered.

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## 4.5 Scarce Skills Development Fund

In order to address a severe shortage of skills required for national development and competitiveness, the South African government passed the Skills Development Act (Act No. 97 of 1998) as a framework for realising this objective. The implementation of this Act through the Human Resource Development Strategy for South Africa outlines the responsibilities of various government departments. The Department of Labour (DoL), in conjunction with the DoE and DST, has been mandated with the responsibility of ensuring training in scarce skills, both in higher education and other training institutions, especially in the fields of science and technology. In order to deliver on this objective, DoL recommends the allocation of resources from the National Skills Fund for bursaries and scholarships.

The NRF as a national agency with a mandate to support the development of high-level skills at postgraduate level has become the implementing agency for DoL for the provision and support of scarce skills at postgraduate levels in science and technology.

The NRF intends delivering on the following strategic objectives:

- Establishing the National Scarce Skills Financial Assistance Scheme with an Advisory Board;
- Increasing the number and quality of students in areas of priority; and
- Facilitating the development of postgraduate courses in higher education to meet the specific needs of industry.

### Challenges for 2005/06 and in the longer term

- For the NRF to implement and manage a sustainable and effective human resource development programme aimed at addressing the provision of scarce skills, long-term financial commitment by DoL is critical. The development of high-level skills requires longer-term commitment from all parties involved, including funders, managers, trainers and intended beneficiaries;
- The NRF regards promoting the partnership between itself, the DoL and the DST as crucial for the success of this endeavour;
- Discussions have been concluded between the DST and DoL for the DoL to release additional earmarked funding for skills development in bioinformatics in support of the DST's National Biotechnology Strategy. DoL will make available an additional amount to support students for this purpose; and
- The roll-out of the postgraduate bursary scheme for students with disabilities, which will also be funded by the DoL.

### Budget

The budget allocated for bursaries and scholarships by the Scarce Skills Development Fund for 2004/05 will probably remain unchanged at about R30 million per annum. All direct expenses related to these bursary schemes will be recovered from DoL.

## 4.6 Biodiversity programmes

At the request of the DST, the NRF manages two initiatives linked to the biodiversity science thrust of the National R&D Strategy, namely the South African Biodiversity Initiative (SABI) and the South African Biodiversity Information Facility (SABIF):

- SABI aims to develop a representative community of systematic biologists, well supported by government and society, that addresses exciting and important issues relevant to SA's rich biological heritage; and
- SABIF aims to contribute to South Africa's sustainable development by facilitating access to biodiversity and related information on the Internet.

### Challenges for 2005/06 and in the longer term

The DST has recently appointed the Manager of Conservation and Management of Ecosystems and Biodiversity Focus Area as a National Contact Point (NCP) in South Africa for the Theme: Global Change and Ecosystems. The function of this NCP is to promote South Africa's involvement in the European Commission's FP6 Funding Programme.

The NRF manages the Sea and Coast Programme with Department of Environmental Affairs & Tourism (DEAT) as a co-investor. This research programme provides information, advice and training in support of optimal and sustainable use and

development of our sea, coasts and estuaries. The Sea and Coast Programme ends in 2006 and the South African Network for Coastal and Oceanic Research (SANCOR), administered by the NRF, will undertake an independent evaluation of this programme in 2005.

The NRF will continue to manage the provincial research projects for the Branch: Marine and Coastal Management (MCM) of DEAT. These projects have a strong applied research focus which feed into the management of marine and coastal resources, including resource allocations for the fishing industry.

## **Budget**

The allocations for 2005/06 are:

SABI:	R2,50 million
SABIF:	R2,70 million
Sea and Coast Programme:	R2,00 million
SANCOR:	R0,285 million
MCM's 2005 Provincial Research Projects:	R3,60 million
Operational budget for FP6 activities:	unknown at this stage.

## **4.7 South African National Antarctic Programme (SANAP)**

In 2004, the DST appointed the NRF as implementing agency to administer the grant award process for SANAP in conjunction with DEAT, who will continue to administer the logistics of the programme. The vision for the programme is to create a demographically balanced Antarctic research programme that strives for high-quality international research, links to other African countries and interdisciplinary research. Thirty-two applicants were adjudicated for the 2004 round and a budget will be tabled with the DST in accordance with the Memorandum of Understanding.

### **Challenges for 2005/06 and in the longer term**

- Establish a national research programme that will produce maximum human capital, innovation and economic growth;
- Increase international profile and influence; and
- Create a co-ordinated interactive effort towards public visibility.

These challenges will be met through:

- Taking advantage of new commercial potentials and research opportunities that involve industry;
- Aiming for critical mass of local scientists in the programme from institutions previously not participating in the programme;
- Promoting fundamental research, which seeks to increase knowledge and develop multi-disciplinary links from basic research to applied knowledge;
- Increasing human capital; and
- Developing R&D as well as a connectivity programme with industry.

## **Budget**

The estimated budget is R5,0 million.

## **4.8 Indigenous Knowledge Systems (IKS)**

Similar to STAC, the NRF receives a ring-fenced grant for IKS from the DST in support of research and human resource development in the field of indigenous knowledge. IKS has been identified as a Focus Area within RISA and all IKS activities have been integrated in the RISA activities. RISA does, however, report separately to the DST on the outputs and outcomes of this programme. The programme has been reviewed by the DST in 2004/05. Pending the decisions of the DST, the new structure of RISA will enable the NRF to take the programme forward in a meaningful way that will develop the field and stimulate IKS research capacity and quality knowledge production.

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## Budget

The ring-fenced IKS grant from the DST amounts to R10 million annually.

## 4.9 Innovation Postdoctoral Fellowship Programme

The NRF has been requested to manage this programme on behalf of the DST. The Innovation Postdoctoral Fellowship Programme is a five-year programme that will aim to support up to 100 new postdoctoral fellowships with R15 million per annum from the DST.

## 5 Programmes that facilitate the interface between science and society: SAASTA

### Rationale

The South African Agency for Science and Technology's (SAASTA's) mandate is to promote public awareness, appreciation and engagement of science, engineering and technology (SET) in South Africa. Science, mathematics and technology education through pre-tertiary, tertiary and lifelong learning initiatives provide the base for creating the required human capital for South Africa's SET endeavours. More specifically, SAASTA aims to increase the number of previously disadvantaged learners that enroll for and perform in mathematics and science.

SAASTA can make a major contribution to growing the size and raising the quality of the feeder system that inputs into other NRF human resource development strategies. SAASTA will therefore strengthen the capacity of the NRF to deliver on the key driver of the increased number and quality of PhDs. The agency will enhance the NRF's seamless approach to human resource development. This approach entails the promotion of a pipeline of appropriate human capital from a schools level to building student capacity, research expertise, entrepreneurship, technological capacity and eventual innovation that in its turn will create economic growth and improved quality of life.

### Scope

Since the beginning of 2004, SAASTA has been engaged in reviewing and redefining its strategy. Based on extensive consultation three strategic pillars were identified for the science promotion and awareness programmes of the NRF:

- Education-related programmes (preparing tomorrow's scientists and innovators);
- SET awareness platform incorporating a reconstituted museum, the NZG and the Johannesburg Observatory, and infrastructure available through the National Research Facilities (engaging with the phenomena of science); and
- Science communication (communicating the research advances of science to the public).

The three pillars or thrusts are not neat discrete units, but are interdependent, interlocking areas of operation. Each thrust can support and heighten the impact of the others, and it is expected that programmes spanning two or more thrusts will be conceptualised. This model enables SAASTA to implement in-house programmes in each of the areas, as well as national programmes that seek to cover all three thrusts.

In addressing the first strategic pillar SAASTA has to establish science outreach programmes that address the challenges prevalent in the education system. These outreach programmes will focus on science, mathematics and technology education through different learning initiatives.

Secondly, a major challenge remains developing the comprehensive science awareness platform, co-ordinated by SAASTA, that will transform the quantity and quality of public science awareness programmes and place South Africa in a lead position internationally.

In the third place, SAASTA is responsible for promoting science through communication mechanisms and by equipping scientists and science journalists to report on science in such a way that public interest and debate regarding the impact of science on everyday life can be stimulated.

The key objectives of the three strategic pillars/thrusts are the following:

STRATEGIC THRUSTS		
Education	Science Communication	SET Awareness Platform
<ul style="list-style-type: none"> <li>• Enlarge the pool of diverse learners who can become future scientists;</li> <li>• Contribute to raising the quality of science, mathematics and technology (SMT) education programmes;</li> <li>• Strengthen partnerships between higher education, industry and school districts; and</li> <li>• Enhance the understanding of everyday use of technology and new discoveries.</li> </ul>	<ul style="list-style-type: none"> <li>• Enhance and improve coverage of science and research advances in the South African mass media;</li> <li>• Encourage and equip scientists to engage with the popular media and public audiences;</li> <li>• Encourage and equip journalists to report science news;</li> <li>• Facilitate public discussions/debate between science and society;</li> <li>• Increase interest in scientific research and appreciation of its impact on everyday life; and</li> <li>• Produce, distribute and market publications, exhibitions and other resource materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop supporting infrastructure for high impact activities at all science promotion sites;</li> <li>• Increase utilisation of the National Research Facilities' infrastructure – linking research, education and the community; and</li> <li>• Promote science and technology through a suite of integrated programmes.</li> </ul>

The role of SAASTA in the broader national sector is the co-ordination and synergy enhancement of field-related areas, such as:

- Communicating scientific research information to wider audiences;
- Setting standards of quality and innovation in web-based programming or learning;
- Establishing sectoral guidelines for monitoring and evaluating science centres and other science promotion projects;
- Creating and/or strengthening alignments and partnerships with higher education;
- Developing and managing a central repository of resource materials;
- Facilitating science communication training and development of both scientists and journalists;
- Conceptualising and co-ordinating national science awareness in collaboration with all NRF business units;
- Conducting attitudinal studies to ascertain public sentiment towards science; and
- Creating greater linkages between science awareness and Indigenous Knowledge Systems in South Africa.

## Challenges

In terms of outreach to learners and the general public, the pending relocation of SAASTA's museum, as well as the acquisition of the Observatory Site in Johannesburg, will affect the scope of activities in view of the potential they present for offering new programmes in the future. This undoubtedly will present the challenge of devising highly innovative, dynamic and relevant programmes that will be sustainable and, simultaneously, stimulate investor interest.

Sourcing sufficient resources to drive the new integrated science awareness platform remains a major challenge, and SAASTA will rely on additional funding from government sources (eg, Department of Public Works) and public-private partnerships.

The lack of competent, appropriately skilled staff members with the ability to conceptualise and implement large, high impact programmes at both the local and national level as well as serve as major role-players in the science, mathematics and technology education debate in our country, is still presenting a serious challenge. Revitalised relationships with both the national and provincial departments of education to impact more effectively on the poor mathematics and science education delivery are crucial.

The science promotion system is affected by the absence of nationally accepted performance and evaluation indicators that will enable rigorous reporting in terms of impact in the field. SAASTA is working with the Science and Youth Unit of the DST and the science centres in investigating the development of a national standards framework for evaluation. The recent National Norms and Standards document that was prepared provides a basis that starts to address some of the concerns, but the challenge also remains to develop appropriate indicators and an integrated reporting framework for all science promotion and outreach across the NRF.



# Section A: RISA

## **Key developments envisaged for 2005/06**

- Positioning and improved marketing of SAASTA in relation to its new strategy;
- Developing new infrastructure and innovative integrated science awareness programmes for the Multidisciplinary Science Park at the Observatory;
- Obtaining approval and appropriate funding for the new Life Science Centre at NZG;
- Initiating science communication programmes for large national imperatives, eg, Southern Oceans Islands and Antarctic;
- New programmes that encourage NRF grantholders, bursars and industry partners to become more active in science communication and advancement; and
- Collaboration and integration of outreach activities across all NRF business units.

# Section B:

## National Research Facilities

### 1 Purpose and framework

National Research Facilities constitute a key component of the research infrastructure of the country. The facilities enable the training of research students and the generation of internationally competitive research in areas of strategic importance to South Africa. Generic to all facilities is the necessity to ensure their continued relevance in terms of state-of-the-art infrastructure, their capacity to provide the required training needs, to grow collaborations (particularly in Africa), and to enhance the S&T profile of South Africa. In many instances there is scope to expand this capacity which, through comparatively modest additional resourcing, can result in economies of scale not yet achieved.

Institutions have to meet the following criteria in order to be considered a National Research Facility:

- They should have a unique position in South African knowledge production;
- The core technologies, research methods, or data pools/collections should live up to international standards;
- Their goals should be well aligned with the overall objectives of the NSI, especially with regard to the diffusion of new knowledge;
- They should have critical mass of equipment, skills and users – these include researchers from the higher education sector, Science, Engineering and Technology Institutions (SETIs) and, where appropriate, from industry;
- They must have potential for networking and for attracting international collaborators to South Africa;
- They must offer opportunities for human resource development, with special effort to get disadvantaged researchers involved; and
- They must provide opportunities for the advancement of science and for the interface between science and society.

Currently, the following National Research Facilities are managed under the mandate of the NRF:

- South African Astronomical Observatory (SAAO);
- Hartebeesthoek Radio Astronomy Observatory (HartRAO);
- Hermanus Magnetic Observatory (HMO);
- South African Institute for Aquatic Biodiversity (SAIAB);
- South African Environmental Observation Network (SAEON), an emerging National Research Facility;
- National Zoological Gardens (NZG); and
- iThemba Laboratory for Accelerator Based Sciences (iThemba LABS).

These facilities are clustered in terms of the area of knowledge production or of the national need that is being serviced, namely:

- Astro/Space/Geo sciences;
- Biodiversity/Conservation; and the
- Nuclear sciences.

The alignment of this clustering with the science themes identified in South Africa's National R&D Strategy such as the Southern Oceans Islands and Antarctic; Bio-resources/sciences; Astronomy and Earth Observation, is evident. National Research Facilities are therefore positioned to make an impact on the national research and innovation agenda.

# Section B:

## National Research Facilities

### 2 Challenges faced by National Research Facilities

All the National Research Facilities share common challenges linked to funding, development of intellectual resources and competing in the global arena. The most salient points, generic to the majority of the facilities, are outlined in this document. For greater detail, please consult the individual business plans for each facility.

#### 2.1 Human capital for science and technology

In view of the key driver of the activities of the NRF, namely the production of large numbers of high-quality PhDs required as the bedrock for an innovative and entrepreneurial knowledge society, the facilities are challenged to complement the efforts of other business units of the NRF to develop human capital. Demographic changes in the South African scientist population need to be engineered through the facilities. However, the facilities aim specifically to deliver highly skilled people who can utilise the National Research Facilities to generate new knowledge, develop and use new technologies, innovate, and drive the competitiveness of the country in specific areas of expertise. The National Research Facilities will continue to contribute to a broader pool of young researchers through vocational work, involvement in research projects and in-service training. This implies that more staff will be required to undertake school and public education programmes, so that research staff are free to contribute to tertiary education, while still delivering on their primary function of research.

#### 2.2 National assets with international standing and local relevance

The National Research Facilities are widely recognised as national assets of international standing that provide an indispensable infrastructure platform for “Big Science” projects that, together with the science, also make a real difference in the lives of people. A special effort toward informing the public of the internationally competitive science and technology achievements of the facilities, as well as of the collateral benefits to local communities, will continue in close collaboration with SAASTA.

The facilities’ involvement in large projects such as the Square Kilometre Array (SKA), the SADC GPS Network, the Lunar Laser Ranging for the Southern Hemisphere, Inkaba ye Africa, South African National Antarctic Programme (SANAP), the African Institute of Space Sciences (AISS) and the Major Radiation Medicine Centre (MRMC), among others, raises the expectations of actual events and achievements. The time has come to deliver and 2005/06 will be a crucial timeframe in which to live up to the scrutiny of the international science community.

#### 2.3 Doing much more with just a little more

The main function of the National Research Facilities is to provide local and international access to infrastructure, such as instrumentation, collections, data and specialist knowledge. In order to maintain and improve on international status on a competitive basis, the facilities proved that they deliver an excellent service at a very competitive price to customers and stakeholders. However, this success should not be to the detriment of the longer-term sustainability and funding of the facilities. The major challenge is to make strategic long-term choices and translate those into the resourcing of the facilities. The corporate function, New Business Development, will also be responsible for assisting the National Research Facilities in attracting additional funding.

# Section B:

## National Research Facilities

### 3 Overview of Business Plans for the National Research Facilities

#### The South African Astronomical Observatory

##### Scope

The South African Astronomical Observatory (SAAO) is the National Research Facility for optical/infrared astronomy in South Africa. Its prime function is to further fundamental research in astronomy and astrophysics at a national and international level through the provision and utilisation of a world-class astronomical facility.

As the premier optical/infrared astronomy facility in Africa, the SAAO also plays a leading role in the promotion of astronomy in the continent. In terms of research, it is one of the most productive scientific institutions, having been described by the last international review panel as producing “the most cost-effective astronomical research in the world”. There are strong international links worldwide through scientific collaboration and technological exchange. SAAO’s research excellence is underpinned by strong technical competencies in certain niche areas. Through devising a vastly superior spherical aberration corrector, and a variety of other innovations, SAAO has contributed to making the Southern African Large Telescope (SALT) more capable than its prototype, the Hobby-Eberly Telescope (HET) in Texas. SAAO has also been commissioned to design and build Saltcam, the verification and acquisition camera for SALT.

##### Challenges

The SAAO is facing a critical period as it makes the transition from the SALT construction phase to the SALT operations phase. SALT will commence astronomy operations during 2005/06. To take full advantage of the accumulated expertise and corporate knowledge in the SALT Construction Team, the SALT Board has approved the extension of certain crucial posts for several months to maximise the overlap and knowledge transfer from the construction team to the operation team. Success in meeting this challenge relies on full integration of SAAO staff and SALT construction staff into a single SALT commissioning team for this critical period.

SALT represents a paradigm shift for the SAAO in terms of the level and complexity of technology, the science that will be done, the operations model and concomitant support requirements. Significant organisational changes have already been effected to accommodate this new paradigm, and additional areas have been highlighted for transformation or adaptation to the manner in which SALT will be operated and utilised by the scientific community. Success in meeting this challenge will depend on the identification of, and phasing in of, necessary organisational changes by the recently appointed Director.

SALT will open up new areas of research which are currently not possible to pursue at SAAO. SAAO scientists will be responsible for spearheading the South African scientific use of SALT and training of the southern African user community. Therefore, a major challenge to SAAO during 2005/06 will be the reorientation of scientific effort towards SALT science. Success in meeting this challenge requires a conscious effort on the part of SAAO scientific staff to embrace the new scientific potentials of SALT and to reorient their scientific interests to take advantage of SALT’s capabilities.

From the outset, SALT was conceived as an African facility. With the advent of large-scale facilities such as SALT and the High Energy Stereoscopic System (HESS), and other initiatives, such as SKA, Inkaba ye Afrika and ZASat, southern Africa is emerging as a regional space science and technology hub. There is much interest by the scientific community in a number of African countries in accessing these facilities, but this interest is tempered by limitations of skills and resources. During 2005/06, SAAO will build on the initiatives commenced in 2004/05 to increase the engagement of SAAO with the scientific community elsewhere in Africa.

The high level of national and international investment in SAAO facilities in Sutherland and Cape Town, coupled to greater accessibility of these facilities by visitors and the public, is matched by an increased exposure to a variety of security risks. SAAO will thus take steps to continue to improve the security arrangements at both locations, commensurate with the increased level of risk, building on the progress already made in 2004/05.

# Section B:

## National Research Facilities

SALT will generate a vastly increased data flow compared to the current set of telescopes and instruments in Sutherland. Having sufficient bandwidth will greatly facilitate fault-finding and resolution during the roll-out phase of the telescope and its instruments. However, the cost of the necessary bandwidth has proven prohibitive. Current negotiations must yield a more affordable alternative. A major challenge to SAAO and its SALT partners for 2005/06 will be the resolution of the issue of the data link, and the integration of SAAO and SALT IT infrastructures.

### Key developments for 2005/06

- Initial astronomy operations staff will be recruited in early 2005. The early success of SALT astronomy operations will set the tone for SALT as an international facility, and having optimum staff will ensure that the telescope is put to the best possible use at a time when it will be under the scrutiny of the international astronomical community.
- The SALT verification and acquisition instrument, Salticam, will be commissioned in the Acquisition Camera and Science Imager (ACSI) mode early in the 2005/06 financial year. The Prime Focus Imaging Spectrograph (PFIS) will also be commissioned on the telescope in 2005/06. These eagerly awaited instruments will give the astronomical community the first glimpses of SALT's capabilities.
- Under the newly appointed Director, SAAO will be restructured for optimal operation in the SALT era. By the start of 2005/06 the recruitment of SALT technical operations staff will be complete, but the recruitment of astronomy operations staff will still be under way. To promote new research directions commensurate with the capabilities of SALT, recruitment of scientific staff will take account of the scientific fields likely to feature in SALT science, as well as instrumentation development plans for the other SAAO telescopes that will be used in support of SALT.
- During 2005/06, SAAO will continue to reorient the operations of the existing small telescopes in support of SALT. Technical effort will be largely reoriented in support of SALT commissioning operations, reducing the amount of technical support available for the smaller telescopes. There will be a movement toward labour-saving, fixed-instrument operations on those telescopes. The 0,5m and 0,75m telescopes will be redeployed for public outreach and student training, while the 1,0m and 1,9m telescopes will continue operations in support of SALT, with instruments complementary to those on SALT.
- Over the past two years, the iconic status of SALT has stimulated a tourism and property market boom in Sutherland. The SAAO has forged a partnership with the Karoo Hoogland to develop the tourism potential of SALT, and to manage this growth in a manner that benefits the local community without compromising the astronomical conditions that attracted SALT to the area in the first place. During 2005/06, efforts will focus on building public-private partnerships to build the Stargate visitor centre and to develop the local capacity to operate such a facility.
- During 2005/06 the first National Astrophysics and Space Science Programme (NASSP) MSc graduates will commence their PhD research programmes in the various NASSP partner universities. As the postgraduate student enrolment in astronomy in the universities increases, student training at SAAO will increase in importance. The SAAO will have to create the necessary conditions to provide unparalleled training.

### Hartebeesthoek Radio Astronomy Observatory

#### Scope

Hartebeesthoek Radio Astronomy Observatory (HartRAO) is the National Research Facility for research and training in radio astronomy and space geodesy in South Africa. It provides facilities for South African and foreign scientists to participate in research using the facilities at HartRAO. The radio telescope is available either as a single, independent instrument or in global networks of radio telescopes using the technique of very long baseline interferometry (VLBI). HartRAO is one of only five permanent fundamental space geodesy stations worldwide and participates in geodetic VLBI through the International VLBI Service, in satellite laser ranging (SLR) through the International Laser Ranging Service (ILRS) and in the Global Positioning System (GPS) through the International GPS Service (IGS). These data are available to the international community.

#### Challenges

Expectations of the international and SADC community, training, funding, and expansion are currently the most prominent challenges facing HartRAO. Technical problems and projects, such as the SKA, a new Space Geodesy facility, and calibration and fine-tuning of the surface upgrade, among others, will receive special attention in the new business year.



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## Key developments for 2005/06

The next couple of years are crucial to the future of HartRAO as the SKA host country decision date (end of 2007) approaches. The Radio Astronomy group is repositioning itself to meet the expectations and demands of NASSP, SKA and increased university involvement. The Space Geodesy group is aligning itself with a multi-disciplinary approach and capacity-building initiatives through expansion, collaboration and new projects.

Prominent developments in the making are:

- Completion of the SKA bidding process;
- Development of the Research and Technology Collaboration Centre (RTCC);
- Groundwork of design and engineering requirements for the SKA Pathfinder;
- Development and construction of a Pathfinder element (one telescope of the array);
- Site selection and survey for the new Space Geodesy Observatory;
- Installation of primary survey markers on Marion and Prince Edward Islands;
- Upgrade and restoration of existing school building to facilitate expansion and development at HartRAO; and
- Development of the Lunar Laser Ranger.

## Hermanus Magnetic Observatory

### Scope

The Hermanus Magnetic Observatory (HMO) functions as part of the worldwide network of magnetic observatories; its core function in this regard is to monitor and model variations of the Earth's magnetic field. It is primarily the HMO's scientific achievements, critical location, and unique facilities that make it indispensable in the global network of magnetic observatories. Consider these facts:

- The density of geomagnetic recording stations in Africa is significantly less than in other continental landmasses. The continuous recording stations operated by the HMO are the only operational sources of ground-based geomagnetic field data south of the equator in Africa.
- Hermanus is one of only four geomagnetic observatories whose data are used by the World Data Centre for Geomagnetism in Kyoto, Japan, for the generation of the Dst ring-current index, which is the most commonly used measure of geomagnetic storm intensity.

### Challenges

A major challenge for the HMO during 2005/06 will be to further develop the strategic initiatives of science outreach programmes for school educators and learners, and postgraduate student training and research capacity-building. Account needs to be taken of the lessons learnt over the past year to enable expansion in the coming year in terms of the numbers of learners, educators, and students reached and the quality of their learning. To be able to increase the number of postgraduate students, it will be essential to increase the student accommodation on the HMO's premises.

## Key developments for 2005/06

The following will be some of the key developments for the HMO during 2005/06:

- The Hermann Ohlthaver Institute for Aeronomy (HOIA), located in the Department of Physics and Electronics at Rhodes University, has for many years been the traditional centre for ionospheric measurements and research in South Africa. Recent discussions on the strengths, weaknesses, opportunities, and threats to ionospheric research resulted in the management of HOIA transferring to the HMO in October 2004. Key objectives during 2005/06 will be to consolidate South Africa's ionospheric research activities and to increase the number of postgraduate students entering this research field.
- Steps toward the HMO's re-entry into Antarctic-based research commenced during 2004/05. A researcher with the appropriate expertise was appointed, meetings were held with researchers from the University of KwaZulu-Natal and North West University on mutual collaboration, and a number of HMO researchers were included as co-investigators in project proposals for SANAP funding. The HMO's takeover of responsibility for the technical maintenance and development of the SHARE HF-radar facility at the SA Antarctic base from North West University will officially commence in April 2005.
- The international and local geophysics communities have expressed significant interest in the rapid decrease of the

# Section B:

## National Research Facilities

geomagnetic field in the southern African region, suggesting that a reverse dynamo may be developing below South Africa. The HMO and the GeoForschungsZentrum (GFZ) in Potsdam, Germany, submitted a proposal for a collaborative project, called Inkaba ye Africa, to study this phenomenon using satellite and ground-based data. However, funding for this project did not materialise and it is hoped that funding will be forthcoming in 2005/06.

- The HMO will play an important role in contributing toward the SKA bid, since characterisation of ionospheric conditions above the proposed SKA sites is a key parameter requirement. The phase delay in global positioning system (GPS) satellite radio signals can be used to determine certain parameters of the ionosphere. Recent research at the HMO has focused on the use of GPS signals received by the ground-based network of South African dual frequency GPS receivers to provide a denser and more timely characterisation of the total electron content (TEC) of the ionosphere than is currently available using only ionosonde data. GPS-derived TEC will be validated and calibrated using data from the existing network ionosondes. Since the radio signals observed by radio telescopes are adversely affected by TEC, the results of this work will also be important for characterising the ionosphere in the planning for, and operation of, the SKA project.

### South African Institute for Aquatic Biodiversity

#### Scope

The South African Institute for Aquatic Biodiversity (SAIAB) is an interactive hub focused on serving the nation by generating, disseminating and applying knowledge to understanding and solving problems on the conservation and wise use of African fishes and aquatic biodiversity.

SAIAB cares for and develops the National Fish Collection; generates knowledge through research on aquatic biodiversity and the fundamental processes and conservation of aquatic biodiversity in Africa; and trains and educates knowledge workers in aquatic biodiversity. It therefore addresses national and international issues in aquatic biodiversity through the priorities set by national and international funding agencies.

#### Challenges

The most direct challenges facing SAIAB at present are to:

- Ensure continued funding for ACEP;
- Develop and balance the internal high-level research capacity of SAIAB in order to address pressing national and international needs in aquatic biodiversity;
- Develop and balance the high-level biosystematic skills capacity across the environmental and biological spectra, in order to address pressing national and international needs in aquatic biodiversity;
- Inspire, educate and train a new generation of South African aquatic biosystematic and conservation scientists;
- Develop a "knowledge management system" within the Institute and its interface with the network of external clients. This system is especially required to develop and manage aquatic biodiversity databases;
- Ensure the long-term occupational health and safety of staff and visitors and the security of collections cared for by the Institute, through the development of new off-site physical infrastructure; and
- Consolidate the position of SAIAB within the NSI, especially in relation to the new South African National Biodiversity Institute (SANBI).

#### Key developments for 2005/06

SAIAB is currently planning a new off-site collection facility to house the National Fish Collection. This new facility should be completed in the 2005/06 period. Transfer of the National Fish Collection will be a disruptive but essential activity. The planning for, and refurbishment of, the space vacated in the SAIAB building will overlap and follow these activities.

Other key developments will include:

- increasing research staff capacity for inland systems;
- establishing a suitable platform for ACEP to continue to function as a flagship programme for SAIAB; and
- establishing an "Information Hub" for aquatic biodiversity in southern Africa.

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### South African Environmental Observation Network

#### Scope

The purpose of the South African Environmental Observation Network (SAEON) is to generate long-term information relevant to the sustainable management of natural resources and habitat over a range of ecoregions and land uses, including:

- pristine (wild) landscape;
- partially pristine (managed) landscape;
- agriculturally (rural) transformed landscape; and
- urban transformed landscape.

SAEON will establish innovative research platforms and information management systems for long-term multi-disciplinary, multi-institutional and participatory ecosystem studies with strong regional and global linkages. These research platforms are co-ordinated as Nodes, with the first one having been established during 2004 in Phalaborwa. As ecosystem understanding is improved through SAEON, it feeds into new policies and strategies to promote wise use and management of the goods and services that are provided by ecosystems; as well as into negotiations on global climate change management and economics. In addition, SAEON will work towards direct social benefits through improved environmental science education (public and formal) and awareness, environmental quality, sustainable development and livelihoods practices, and early warning systems for the prediction of hazardous environmental change.

#### Challenges:

SAEON's currency is long-term environmental data and accordingly its challenges are to:

- Offer leadership in long-term data systems;
- Archive long-term data (own and other);
- Make long-term data accessible;
- Broker and partner long-term data;
- Integrate long-term data;
- Determine national indicators of long-term environmental change;
- Package long-term data;
- Secure the SAEON system and long-term data collections;
- Communicate with local and international stakeholders; and
- Provide a platform for capacity building, outreach and education.

#### Key developments for 2005/06

- Establishing the SAEON Ndlovu Node;
- Designating and launching a SAEON Fynbos Node and a Marine and Coastal Node. Submissions will be evaluated by the SAEON Technical Steering Committee for a final recommendation to the SAEON Advisory Board;
- Initiating a consultative process to define the core variables to be measured by SAEON nodes;
- Implementing an innovative information management system to allow for the archiving, retrieval and visualisation of environmental data;
- Implementing an innovative education outreach strategy focused at three levels namely, secondary, tertiary and public education;
- Implementing a communication strategy to keep the public, stakeholders and partners informed about SAEON's business achievements, relevance and requirements;
- Supporting and influencing International Long-Term Ecological Research (ILTER) and Environmental Long-Term Observatories of South Africa (ELTOSA) appropriately through the high profile that SAEON obtained; and
- Launching and supporting national cross-cutting projects, eg, on climate data.

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### National Zoological Gardens

#### Rationale

The National System of Innovation represents a partnership between all institutions that are involved in the creation of new knowledge, its application and innovation, for the benefit of the people of South Africa. To achieve this, large numbers of well-trained, scientists, engineers and technologists are required in all fields that are of importance to the future. As part of the NRF, the NZG is extremely well positioned to make a substantive contribution towards an increase in the number of appropriately qualified and skilled experts in terrestrial biodiversity. Biodiversity is one of the key fields in which knowledge generation and utilisation has to be advanced for the improvement of the quality of life of South Africans in particular, but in Africa in general. To this end, the NZG has to:

- provide the required infrastructure for research, science education and science awareness; and
- facilitate the creation of relevant knowledge essential for addressing the aforementioned priorities.

#### Scope

The NZG was declared a National Research Facility in April 2004 and has since been engaged in a strategic re-orientation process to align with, and make a contribution to, the core missions and strategic priorities of the NRF. The NZG is undergoing a radical transformation from being a traditional zoological garden, to being a national facility for research in terrestrial biodiversity and an active participant in terrestrial biodiversity research. The NZG has the potential to offer South Africa, Africa and the international community at large the infrastructure required to conduct world-class, knowledge-generating research. The NZG houses one of the largest animal collections in the world, operates three breeding centres and covers an area of over 6 000 hectares. The NZG is also very well placed as an education platform, receiving close to 600 000 visitors a year, comprising learners, educators and the general public. Its potential to influence and encourage learners to follow science as a career is therefore immense, making the NZG a strategically significant component of the NRF in achieving its objectives, and an important partner of SAASTA in its quest to nurture the next generation of scientists.

#### Challenges

As a newly-declared National Research Facility, the NZG is facing key strategic and operational transformation challenges over the next three to five years. These include:

- Completing the strategic planning process, resulting in a new vision and mission statement, redefined focus areas, and well-defined strategic priorities and objectives set within the three strategic principles adopted by the NRF Board: science awareness, research and operational efficiency;
- Restructuring of operational functions to align with the facility's redefined core business;
- Reviewing and redesigning of business processes to meet new requirements;
- Establishing and operating a research department as part of the process of transforming into a state-of-the-art research facility; and
- Supporting SAASTA's mandate to advance science awareness, communication and education by, among others, the establishment of a Life Sciences Centre.

#### Key developments for 2005/06

In the period 2005/06, the NZG envisages:

- Completing the strategic planning process;
- Completing the review and re-alignment of HR and financial policies, processes, procedures and systems;
- Initiating the establishment of a research department;
- Reviewing and reframing the following functions:
  - animal collection and conservation management;
  - educational outreach programmes;
  - facilities management (including horticulture);
  - business development; and
- Developing an information management system.

# Section B:

## National Research Facilities

### iThemba LABS

#### Scope

iThemba LABS focuses on providing scientifically and medically useful radiation through the acceleration of charged particles using the Separated Sector Cyclotron (SSC), a Van De Graaff Accelerator and other appropriate technologies. It is the primary centre of expertise in radiation medicine and nuclear science and technologies in South Africa.

#### Challenges

- Growing the research facilities and infrastructure within the LABS to enhance training, human resources development and transformation and international collaborations (especially in Africa) to improve the Science and Technology profile of South Africa;
- Utilising funds effectively and efficiently to promote the development of skills and research effort within a constrained funding environment which does not actively encourage rapid growth;
- Communicating and interacting with HEIs to facilitate a quantum increase in postgraduates in Science and Technology, which is essential both for transforming the South African S&T workforce and for building a successful economy to minimise the impact of poverty;
- Recruiting and retaining skilled employees within an extremely competitive labour market where the black skilled labour force is in high demand and very mobile;
- Actively seeking new markets and/or developing new products for Radionuclides while at the same time maximising sales for the existing product portfolio;
- Developing an associated safe operating environment for its employees;
- Proactively managing the impact of ageing and obsolete equipment and infrastructure to minimise disruptions in operations; and
- Realising the Major Radiation Medicine Centre (MRMC) project which will create an on-site international centre of excellence in radiation therapy for cancer and other related treatments.

#### Key developments for 2005/06

In 2005/06, iThemba LABS intends:

- Securing funding for the MRMC project, and finalising its corporate governance structures;
- Upgrading the Radionuclide Production facilities and Beam Lines for the production of Fluorine-18 ( $^{18}\text{F}$ FDG);
- Actively using the Vertical Beam Target Station within Radionuclide Production to increase production/sales;
- Refurbishing the Schonland Research Unit and integrating the facility within the iThemba LABS infrastructure;
- Investing in research equipment to facilitate postgraduate research in Sub-Atomic Physics and Materials Sciences;
- Recruiting patients from, especially, Africa, for the current Proton/Neutron Therapy facilities to increase benefits to more patients and to further develop a prototype recruitment model for the MRMC; and
- Enhancing interaction with HEIs to expand the Graduate School concept on a national basis.

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### 4 Collective contribution of the National Research Facilities to the NRF core missions and strategic priorities \*

\* Please note that the projected contribution of NZG is not included in the numbers below, although a narrative on its contribution is provided where applicable.

#### 4.1 The contribution of the National Research Facilities to the corporate core missions

##### NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

**High-level objective 1:** Stimulate undergraduate and honours students' interest in postgraduate studies

**KPI:** Effective attraction and retention of learners in SET through the intervention of National Research Facilities

**Expected outcome:** Increased enrolment and completion rates of SET students at honours degree level

**Expected impact:** Increase in Master's and PhD enrolments in SET

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Provide experiential training: students to spend time at and participate in work of the facilities as part of their formal training	No. of students involved	62	65	>65	>73	>80
Provide short-term formal teaching	No. of research staff involved in shorter-term formal teaching	30	30	30	35	40
Provide vocational holiday employment	No. of students employed	33	32	38	51	>60
Run summer schools/practicals/vacation schools	No. of students involved	35	31	40	45	50

##### SAAO

13 NASSP honours students received research training in Sutherland, and three SALT engineering bursars received holiday employment at SALT.

In 2004, the SAAO Summer School was reoriented to provide an introduction to astronomy for the honours level NASSP intake.

##### HMO

To achieve the projected numbers above, it will be essential that the living accommodation on the HMO's premises be increased (currently a maximum of 12 students can be housed if rooms are shared).

##### SAEON

SAEON envisages that postgraduate research and practical graduate training will be facilitated by its nodes. SAEON is a network and a platform but not an institute and the number of students involved at different levels will depend on the attractiveness of the nodes to students and their supervisors.

##### NZG

Forms of training include Game Capture and Wildlife Management. Currently, the Universities of the Witwatersrand and Pretoria and the Tshwane University of Technology are involved in the NZG pre-graduate support programmes. It is envisaged that the programme will be expanded to other universities in 2005/06.

# Section B: National Research Facilities

## NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

### High-level objective 2: Support for Master's and PhD training in higher education

KPI: Effective and efficient teaching, training, supervision and co-supervision of postgraduate students by National Research Facility staff

Expected outcome: Increased completion rate of Master's and PhD students in prioritised areas and targeted institutions

Expected impact: Increased number of PhDs per million population

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Maximise supervisory capacity of National Research Facilities	Students involved in postgraduate training that use the facilities provided by the National Research Facilities	166 B: 93 – 56% F: 46 – 28%	191 B: 53% F: 30%	210 B: 55% F: 30%	229 B: 60% F: 35%	251 B: 65% F: 50%
	No. of Master's and PhD students supervised by staff of National Research Facilities	74 B: 52 – 70% F: 22 – 28%	65 B: 70% F: 30%	70 B: 70% F: 35%	75 B: 70% F: 35%	80 B: 70% F: 40%
	No. of research staff involved in supervision/co-supervision of postgraduate students	26	35	40	40	>40
Establish and maintain special graduate schools	No. and type of initiatives	4	4	6	7	8
	No. of HEIs involved in graduate schools*	7	6	8	8	10
	No. of students who complied with requirements for obtaining their degrees	N/A	Information not yet available			

\* The number of HEIs will decline due to the merger of institutions.

### SAAO, HartRAO, HMO

NASSP students are shared by all the members of the NASSP consortium, including the National Research Facilities of HMO, SAAO and HartRAO for the honours and taught Master's component. However, the research component of the Master's and PhD research will be done at a single facility, with no double counting.

### SAIAB

SAIAB participates actively in the Rhodes University undergraduate and honours level teaching programme. In 2005/06 SAIAB will conduct a course in aquatic biodiversity for the students at the University of Fort Hare. It is intended to open negotiations to offer this course to other HEIs involved in the education and training of students in biodiversity studies.

### SAEON

It is one of the main functions of SAEON to provide education and research platforms through its nodes where students will be supervised by external researchers and academics.

### NZG

The nature of support includes provision of bursaries as well as access to facilities, materials and equipment.

An MoU with the Veterinary Sciences Faculty, University of Pretoria, Onderstepoort, is in the process of being finalised.

### iThemba LABS

iThemba LABS will start with Master's courses in Accelerator and Nuclear Sciences.

# Section B: National Research Facilities

## NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

### High-level objective 3: R&D staff capacity

KPI: Effectiveness of R&D staff development at National Research Facilities

Expected outcome: New/expanded research activities in line with national priorities, while supporting equity and redress

Expected impact: Increase in number of R&D staff per million population

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Staff development initiatives	Total no. of staff enrolled for higher degrees in broad scientific fields	27 B: 20 – 74% F: 12 – 44%	30 B: 30% F: 30%	30 B: 60% F: 33%	30 B: 65% F: 40%	30 B: 65% F: 45%
Create postdoctoral posts	No. of postdoctoral posts	4	5	9	13	16
Promote staff mobility	No. of staff who spend time (between 3-12 months) as visiting fellows elsewhere	7	7	9	9	10
Joint appointments with HEIs	No. of joint appointments co-sponsored by HEIs	6	7	8	9	10

### SAAO

The entry level for astronomy research posts is a PhD, but SALT is expected to provide some opportunities for a few people to work towards part-time MSc or PhD degrees and to graduate beyond the planning horizon of this document.

### NZG

Two permanent researcher posts and one postdoctoral post will be created as a result of the establishment of the research department in the NZG. Staff development in education (in support of the science education mandate) includes two postgraduate bursaries offered to staff members enrolled for a BEd Honours degree and a Master's degree in Education.

# Section B: National Research Facilities

## NRF CORE MISSION 1: HUMAN RESOURCE DEVELOPMENT

### High level-objective 4: Science advancement – the interface between science and society

KPI: Effectiveness of science outreach activities

Expected outcomes: Improved science literacy in targeted schools

Improved educator skills

Involvement of communities in projects

Expected impact: Improved school pass rates (university exemptions with mathematics and science at higher grade)

Exposure of public to all sciences

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Interaction with schools	No. of schools reached per type of activity	341	430	>400	>400	>400
	% disadvantaged schools reached	89% (302)	85%	85%	85%	90%
Interaction with educators	No. of educators reached through workshops	1 706	1 500	1 600	2 000	2 000
Community projects in collaboration with disadvantaged communities	No. and reach of community projects	16	11	15	20	20
Interaction with public at large	No. of visitors	25 305	25 000	>25 300	>26 500	>27 250

Most of the National Research Facilities participate in events such as SciFest and receive media exposure from time to time.

### SAIAB

SAIAB's outreach activities are expected to grow over the next few years as the programme develops and it acquires a new outreach vehicle. A new environmental education officer is being recruited to fill the vacant post, and this is expected to boost the programme in 2005. It is planned to engage an Environmental Education student to study the effectiveness of the outreach programme.

A programme to invite selected learners to visit the Institute during SciFest will be initiated.

The quantity and quality of output of educational and public awareness of science products has increased dramatically in the last two years. There will be continued emphasis on high-quality products and educational resources.

### SAEON

The National Office will co-ordinate the programmes performed by an education officer at each node. The number of schools and educators involved will increase over time.

SAEON-supported staff at node level will deal directly with enquiries for expertise by the public but this is also the mandate of many of its partners and the node staff will often refer such enquiries to the relevant expert at a partner institution.

### NZG

Science outreach is one of the priorities of NZG. Science outreach includes interaction with schools, educators, communities and the public at large. For example, for the period 2004/05, the total number of visitors expected at the NZG is almost 600 000. An overall increase of 5% in visitor levels is envisaged for the period 2005/06. Involvement in about 12 exhibitions is envisaged in 2005/06 (10 exhibitions in 2004/05).

### iThemba LABS

iThemba LABS will appoint a postgraduate tutor for grade 12 learners in Maths and Science at disadvantaged schools in Khayelitsha.

# Section B:

## National Research Facilities

### NRF CORE MISSION 2: KNOWLEDGE GENERATION (RESEARCH AND DEVELOPMENT) IN PRIORITISED AREAS

<b>High-level objective:</b>	<b>Promote and support knowledge production</b>
KPI:	Quantity, quality and relevance of knowledge production
Expected outcomes:	Increase in number of quality outputs Visibility (of relevance) of research produced by National Research Facilities
Expected impacts:	Increase in global share of relevant knowledge production and exploitation Societal benefit of research

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Facilitating knowledge production	Research reports	23	45	60	65	75
	Journal articles (ISI and other refereed)	217	112	130	150	160
	Full-length conference proceedings	27	43	29	32	34
	Chapters in books	16	4	3	4	5
	Books	1	2	2	2	2
	Publications with external co-authors	182	93	95	110	116
	Patents awarded	1	0	0	0	0

Examples of the number of quality research publications, the relevance of the knowledge generation and the nature of collaboration of the National Research Facilities include:

#### HartRAO

HartRAO collaborates with several international facilities, among others NASA JPL, NASA GSFC, Natural Resources Canada, University of Portugal, GFZ Potsdam, as well as international networks of facilities making up large consortiums that operate and manage networks such as the European VLBI Network, International GPS Service, International VLBI Service and International Laser Ranging Service.

#### HMO

The HMO's research activities contribute significantly toward some of the priority basic science themes in the DST's National Research and Development Strategy. In particular, the HMO's current research activities already match the Astronomy and Earth Observation theme, while the HMO has commenced steps toward its re-entry into Antarctic-based research, which will align it with the Antarctic Research theme. Many of the HMO's services and products also contribute to the DST's technology and innovation missions.

#### SAIAB

The five-year review indicated that SAIAB research staff productivity is at international levels, and is geared towards a balanced spread of product. An increased emphasis on peer-reviewed articles in quality rated journals is required but attention to this product class should be balanced with other outputs. The gradual increase in scientific staff planned over the next few years is expected to increase overall output over time but because new employment is focused on young, relatively inexperienced individuals, the rate of improvement is expected to be gradual.

The SAIAB research project portfolio is resourced competitively for the large part. It therefore addresses national and international issues in aquatic biodiversity through the priorities set by national and international funding agencies. In the great majority of cases SAIAB research is carried out through collaboration with researchers from various HEIs and other institutions. ACEP is SAIAB's largest programme, and by definition is multi-national and multi-institutional in design. Several other SAIAB projects are undertaken within a framework of formal understanding with external institutions, such as the Norwegian Institute for Nature Research.



# Section B: National Research Facilities

## **SAEON**

The number of staff at the National Office will remain static and without a knowledge production mandate they will mostly contribute to papers on science management only. Opportunities will arise from within ILTER and ELTOSA to co-author papers with international colleagues.

SAEON's objectives and outputs fall squarely within the Biodiversity Focus Area of the National R&D Strategy. The nodes will be open for use by scientists from abroad whose research will contribute to the objectives of a node and who agree to the data provision and usage policies of SAEON. It is expected that the number of international scientists will grow over time.

## **NZG**

A research strategy and agenda is to be developed and established in 2005/06.

# Section B: National Research Facilities

## NRF CORE MISSION 3: UTILISATION OF RESEARCH RESULTS, TECHNOLOGY TRANSFER AND INNOVATION

**High-level objective:** Stimulate the use of publicly-funded research and technology development

**KPI:** Usefulness of knowledge produced

**Expected outcomes:** Increase in quality patents

Increase in knowledge and technology dissemination and uptake

**Expected impact:** Greater participation in global knowledge economy

Due to the differing performance measures, we highlight only the most salient points. Please refer to the detailed business plans for each facility for more specific information.

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Knowledge/technology diffusion and dissemination	Contract research income	R7,6m	R9,0m	R9,0m	R10,0m	R11,0m
	Number of research contributions made by staff to conferences	65	50	53	55	60
	Conferences arranged by National Research Facilities	8	4	4	8	7-8
	Patents filed	1	0	0	0	1

An example of the dissemination of knowledge/technology:

### HMO

The Fluxgate Magnetometers (FGE) at Hermanus, Hartebeesthoek, and Tsumeb operate continuously with data sampling at one-minute intervals. The data are distributed internationally via a number of World Data Centres and INTERNATIONAL MAGnetic observatory NETWORK (INTERMAGNET) Geomagnetic Information Nodes (GINs).

# Section B: National Research Facilities

## NRF CORE MISSION 4: HIGH-QUALITY INFRASTRUCTURE

<b>High-level objective:</b>	<b>Provide research infrastructure and equipment</b>
KPI:	Effective provision of research infrastructure and equipment in prioritised areas
Expected outcome:	Cost-effective infrastructure and research equipment for the national benefit
Expected impacts:	Improved quality and quantity of research output Increased competitiveness

Supporting objectives	Performance measures/outputs	Performance 2003/04	Revised projection 2004/05	Short-term target 2005/06	Longer-term target	
					2006/07	2007/08
Acquisition and renewal of equipment and infrastructure	Amount budgeted	R19,1m	R23,7m	R17,31m	R17,01m	R17,01m
Recruiting R&D technical support staff	No. of additional R&D technical support staff recruited	23	8	–	–	–

### SAAO

- The SALT and SALT first-light instrumentation are under development.
- The instrumentation on the SAAO 1,0m and 1,9m telescopes is being upgraded to support SALT science.
- The main focus of infrastructure upgrading and development is to position SAAO to bid competitively for the SALT second-generation instrument development.

### HartRAO

The infrastructure upgrades such as the telescope surface upgrade, the new hydrogen maser frequency standard for VLBI and the Mk V disk-based data recording system for VLBI will be used to improve performance.

### HMO

The obsolete PVM magnetometers at Hermanus, Hartebeesthoek, and Tsumeb have been converted to total field magnetometers to overcome breakdowns. Over the next few years it is planned to replace these with new suspended dIdD magnetometers which, according to design specifications, will have minimal baseline drift, thereby minimising the need for absolute measurements. A new dIdD system has been ordered for Hermanus and should be installed by 2005.

### SAIAB

The construction of a new collection facility for SAIAB will begin in 2005/06. Planning for the refurbishment of the existing building will also begin in 2005/06 and carry through to 2006/07. The new collection facility will provide state-of-the-art storage conditions for the National Fish Collection and will create space for future growth for at least five to 10 years. The potential for future expansion is being built into the design.

The vacated space in the SAIAB building allows for expanded research and administrative facilities to be created. In particular, a new library will be fitted and the administrative and communication divisions will be consolidated into units.

A new phase for ACEP is expected to begin in 2005/06 when its funding status has been secured. Included in the plans for this period is the acquisition of an outreach vehicle and a multibeam echosounder for ocean bed exploration. These are essential items for the exploration of coelacanth habitats and the off-shore ocean bed environments of southern Africa. Such items are not generally available for South African scientists at present.

### SAEON

SAEON is more a provider of basic laboratory equipment at the site/node level than a provider of expensive specialist equipment. Because the ecologist's laboratory is the field, this is an important innovation, facilitating research progress and sharing of equipment. A node is also much more than the equipment present. Nodes will provide co-ordinating and service staff, and will be linked with each other through an IT network. In addition, nodes will attract more funds than just the SAEON core support and will also be supported by in-kind contributions from partner organisations.

# Section B:

## National Research Facilities

### NZG

NZG provides a unique animal collection, and animal exhibits. NZG also has a databank operating according to the requirements of the International Specimen Information System (ISIS). The Life Sciences Centre will provide important infrastructure for science outreach programmes.

### iThemba LABS

Capital expenditure in 2005/06 will include R9,9 million for the new Schonland Institute refurbishment; R4 million from the Innovation Fund for the <sup>18</sup>FDG and GA projects; and R2,2 million for the second beamline for proton therapy.

### 4.2 Examples of facility contributions to the NRF corporate strategic priorities

During 2005/06, the National Research Facilities will continue to contribute to the NRF corporate strategic priorities.

#### STRATEGIC PRIORITY 1: RACE AND GENDER EQUITY AND REDRESS IN HUMAN RESOURCE DEVELOPMENT

The strategic priority, race and gender equity and redress, aims at increasing the participation rates of black and women students, new, young and historically disadvantaged researchers, schools and communities. Examples of how the National Research Facilities will address this priority are, among others:

#### SAAO

The physical sciences and engineering disciplines continue to attract a low number of women students. Where possible, SAAO will seek to attract suitable women applicants to apply for these opportunities.

#### HartRAO

HartRAO is busy establishing a special graduate school for Space Geodesy, which will have close links with Earth Sciences and uses of Earth/Space Sciences for practical applications (for example, the use of GPS for weather prediction). Equity and redress will be a priority in setting the targets for the graduate school.

#### SAIAB

Students involved in postgraduate studies through SAIAB include those supervised by staff and students involved in training through ACEP.

A pilot exercise to offer the University of Fort Hare a short course in ichthyology in 2005 has been initiated. Discussions will be held with other HEIs during the course of 2004/05 to explore the wider demand for such a course within southern Africa. The development of a "winter school" in ichthyology will depend on the outcome of such discussions.

By interacting directly with students at the University of Fort Hare in 2005/06, SAIAB expects to increase the opportunity to attract black and female students. The exposure will also provide an opportunity to develop a holiday employment programme. Outreach programmes are primarily aimed at rural Eastern Cape communities and therefore the proportion of disadvantaged schools and female educators is high.

#### iThemba LABS

With the addition of the Schonland institute to iThemba LABS and the developments with the Pebble Bed Modular Reactor (PBMR), iThemba LABS will establish new graduate schools, thereby contributing to human resource development where equity and redress are priorities. Discussions with the University of South Africa (UNISA) and other HEIs have already commenced.

#### STRATEGIC PRIORITY 2: ADHERENCE TO QUALITY

All facilities use peer review, panel review processes, Advisory Committees, user groups, etc. to ensure adherence to quality. The respective National Research Facilities also adhere to different international and local measures of quality. Examples are:

# Section B:

## National Research Facilities

### **SAAO**

SAAO scientists hold several offices in the various Divisions and Commissions of the International Astronomical Union (IAU). They also serve on the National Committees of the IAU and Committee on Space Research (COSPAR) and on advisory panels for the NRF. One SAAO scientist is at present co-ordinating an inter-governmental National Working Group on Space Science and Technology. Each telescope has a designated telescope manager, who is responsible for ensuring the efficient operation of the telescope and for its maintenance and upgrade schedule. Each major instrument has a designated instrument scientist, who is responsible for training users in the operation of the instrument and for ensuring that the instrument produces data of optimum quality.

### **HartRAO**

HartRAO will continue to run international geodetic VLBI experiments and astronomical VLBI experiments at a success rate of 95%. The satellite laser ranger provides high quality data to NASA and the International Laser Ranging Service (ILRS), and the GPS base station network provides data to the International GPS Service. As in the past, HartRAO will strive to meet and exceed the expected quality criteria of the users of the facility.

### **HMO**

The HMO follows a number of procedures to ensure adherence to quality:

- As an INTERMAGNET-accredited observatory, the HMO operates instruments, carries out observations, and processes data in order to produce geomagnetic field data in accordance with INTERMAGNET standards. The data are distributed to the INTERMAGNET nodes on a daily basis where data quality is monitored.
- The ionospheric data is distributed to the DIDBase system, where it is available for accredited digisonde users to do quality control on the data. The results from these tests are fed back into the DIDBase system for the benefit of other digisonde data users.
- The HMO has acquired Armscor registration, in terms of which it is licensed to provide certain magnetic field-related services to the South African National Defence Force (SANDF) and Denel affiliates. Armscor carries out bi-monthly quality audits of the HMO's services to military clients.
- In terms of South African Civil Aviation Authority (SACAA) approval the HMO is required to adhere to specified standards and practices.

### **SAIAB**

SAIAB ensures that its research is compliant with international standards through different means, including staff qualifications and encouraging staff to be NRF-rated (50% research staff are rated) and through production of peer-reviewed national and international journal articles. Collections are curated according to international best practice and use internationally established management software (Specify). The five-year review of SAIAB conducted in 2004 considered SAIAB to be of international standard in its research and curation.

### **SAEON**

SAEON has two advisory structures: an Advisory Board and a Technical Steering Committee. Ideally, one meeting per annum will be held at a node to include an on-site visit by the Advisory Board members. Formal scientific discourse will be organised as the biennial SAEON Summit. The SAEON Summit is a multi-disciplinary science conference consisting of presentations and workshops. The Technical Steering Committee performs a three-year scientific and organisational review of the nodes and receives annual progress reports and workplans from each node.

### **NZG**

Principles and mechanisms for adherence to quality in knowledge generation at the NZG include compliance with international standards and protocols maintained by the International Species Information System (ISIS), the Pan African Association of Zoological, Aquarium and Botanical Gardens (PAAZAB), the World Association of Zoos and Aquariums (WAZA), the Conservation Breeding Specialist Group (GBSG), and the South African Bureau of Standards (SABS). A Collection Planning Document, to be completed in 2005/06, will detail standards and norms required for the management of animal collections.

# Section B:

## National Research Facilities

### STRATEGIC PRIORITY 3: INTERNATIONALISATION

Internationalisation of science through collaborative research, networking and international conference attendance is a high priority for benchmarking the quality of South African research and its international competitiveness.

#### SAAO

In total, 363 international scientists collaborated with SAAO colleagues or used SAAO data in their research during 2003/04. This trend will continue in 2005/06.

#### HartRAO

HartRAO has extensive international links and is, for example, an associate member of the European VLBI Network. It also operates with the Australia Telescope Long Baseline Array, the US Very Long Baseline Array, the Global Array and the orbiting radio telescope HALCA/VSOP. The facility is also part of the International VLBI Service for Geodesy and Astrometry collaboration as well as of the International Laser Ranging Service. Data from HartRAO services are used internationally and further expansion of international links will be explored.

#### HMO

Even though outsiders very seldom make use of its research equipment, the HMO will distribute data and value-added information to local and international users and international agencies for both research and commercial purposes.

#### SAIAB

During 2004 Dr Tor Naesje from NINA spent a sabbatical visit intended at strengthening and increasing the research collaboration in future. Research staff regularly travel abroad to conduct research on international collections. Other activities for 2005/06 include active participation in several international research initiatives such as the ICEFISH cruise and participation in the All Catfish Species Inventory (ACSI). The ACEP programme is extremely active with partnerships with six African and Western Indian Ocean countries as well as international partners from four different countries in Europe and North America.

#### SAEON

SAEON is a country member and Executive Committee member of ILTER. This involvement has already facilitated interaction and collaboration between South African researchers and their international colleagues. These collaborations are sure to grow, with the appropriate involvement of node managers.

### STRATEGIC PRIORITY 4: FOCUS ON AFRICA

Interaction with Africa is essential to utilise the continent's unique knowledge and expertise. Collaboration is expected to increase once the draft NEPAD Science and Technology Strategy is approved.

#### SAAO

SAAO and the Nigerian Centre for Basic Space Science are in the process of negotiating an Agreement for Scientific Co-operation and Academic Exchange, in terms of which Nigerian scientists would have access to the South African share of SALT time. It is envisaged that similar agreements will be negotiated with other African countries in due course. SAAO is the premier facility of its kind in Africa. SAAO staff visit other institutes on the continent for the purposes of collaboration, but not for the purpose of accessing facilities.

#### HartRAO

The proposed Space Geodetic Institute will have several ties with the SADC region through the provision of equipment, infrastructure and training. The subsequent capacity-building process will improve land management and engineering expertise and will benefit the whole region.

# Section B:

## National Research Facilities

### HMO

The HMO's collaborations with Africa have traditionally been with the SADC countries. The geomagnetic recording station at Tsumeb, Namibia, is operated in collaboration with the Geological Survey of Namibia and forms part of the HMO's observatory network. Observations for input to geomagnetic field models are made annually at secular variation field stations in Namibia, Botswana and Zimbabwe in collaboration with the offices of the Surveyor General in those countries. The HMO is currently investigating the possibility of establishing a new geomagnetic observing station at Gamsberg, on the site of the HESS telescope in Namibia, in collaboration with the GeoForschungsZentrum (GFZ) in Potsdam, Germany.

### SAIAB

In 2004 SAIAB completed an active phase of conducting exploration surveys in several African countries. New opportunities for such work are likely to arise in the near future but are unpredictable. The present focus is to complete publications and biosystematic research arising from these projects. ACEP is also consolidating its partnerships with African countries but expects the number of partnerships to increase steadily. The development of a southern African aquatic biodiversity hub within SAIAB is a new initiative for 2005 that will create opportunities for expanded African interaction. The Library has several African collaborations through the Food and Agriculture Organisation (FAO) document programme.

### SAEON

SAEON is a founding member and chair-elect of ELTOSA. This involvement will facilitate interaction and collaboration between South African researchers, inclusive of node managers, and their colleagues from southern Africa.

### NZG

NZG has strategic linkages with conservation agencies and zoos in several African countries, including Botswana, Angola, Moçambique, Malawi, the Democratic Republic of Congo, Ivory Coast, Nigeria and Algeria. These linkages will be optimised and extended during 2005/06.

### STRATEGIC PRIORITY 5: POSITIONING THE NRF

The NRF is a key player in the National System of Innovation (NSI), one which aims for a more integrated and effective NSI. As such, the National Research Facilities strive to increase stakeholder activities across the spectrum of innovation and increase resources for R&D within the facilities.

### HartRAO

HartRAO will continue to drive the bid for the SKA and a strategy based on capacity development will be developed to ensure sustainability and enhanced support. The initiative for developing a new Space Geodetic facility, which will support Satellite and Lunar Laser Ranging, GPS, Geodetic VLBI and complementary Earth Science instrumentation, will also be pursued.

### SAIAB

ACEP is a flagship programme that positions SAIAB and the NRF at the forefront of deepwater marine science initiatives in the Western Indian Ocean. The programme has established major links between the DST and DEAT in South Africa and between these Departments and top-level officials in countries such as Moçambique, Tanzania, Kenya, Comoros Islands, Madagascar and the Seychelle Islands. In addition, important linkages with major funding agencies in the USA and Canada have been forged. An initiative for funding a three-year collaborative project under the Norwegian/SA bilateral agreement has been proposed for 2005/06.

SAIAB is also active in the inland ecosystems (rivers and lakes) in several African countries and serves as a hub for aquatic biodiversity studies in this region. Its network of collaborating biosystematists and ecologists is worldwide in scope. Within South Africa SAIAB is playing an increasingly relevant role connecting individuals and institutions and is poised to play a key role in the SANBI framework as well as with emerging units such as SAEON and the Centre for Invasion Biology.

# Section B: National Research Facilities

## iThemba LABS

The MRMC project will establish a multi-modal Cancer Centre in South Africa offering Proton and Neutron Therapy as well as treatment using Photons. A PET facility as well as imaging systems will also be available. The Innovation Fund project will produce the first <sup>18</sup>F<sup>18</sup>FDG in South Africa, thereby greatly improving cancer diagnosis in both the public and private health sectors.

## STRATEGIC PRIORITY 6: ORGANISATIONAL TRANSFORMATION

The National Research Facilities will strive for operational best practice in Finances, Human Resources, Information Management, Risk Management, and so forth. Examples are:

### HartRAO

The equity ratios regarding staff at HartRAO is 50% black staff component and 5% women.

### HMO

Business processes at the HMO include project financial management, configuration management and Environment, Health, and Safety (EHS) management which satisfies NOSA standards.

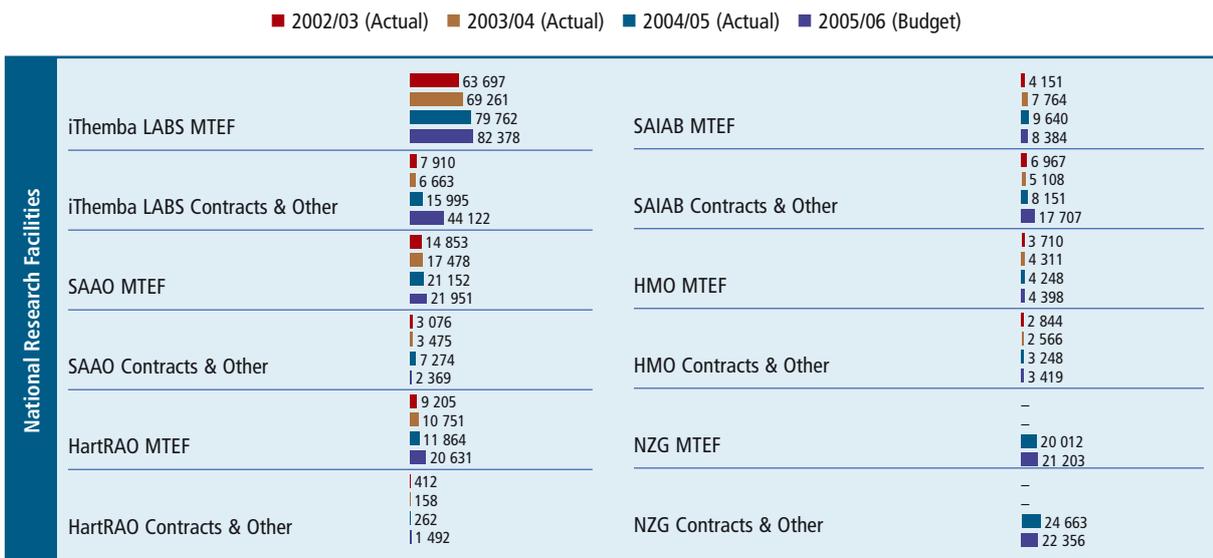
### SAEON

Employment equity in the National Office has already been obtained by the 75% black staff component and the 1:1 gender ratio. It must be assumed that equity on a race basis at the node level may not be attainable at some of the nodes at first.

### NZG

In re-orienting itself as a National Research Facility, the NZG will undergo intensive organisational transformation at all levels.

Figure 4: Comparison of sources of funding for National Research Facilities (R'000)

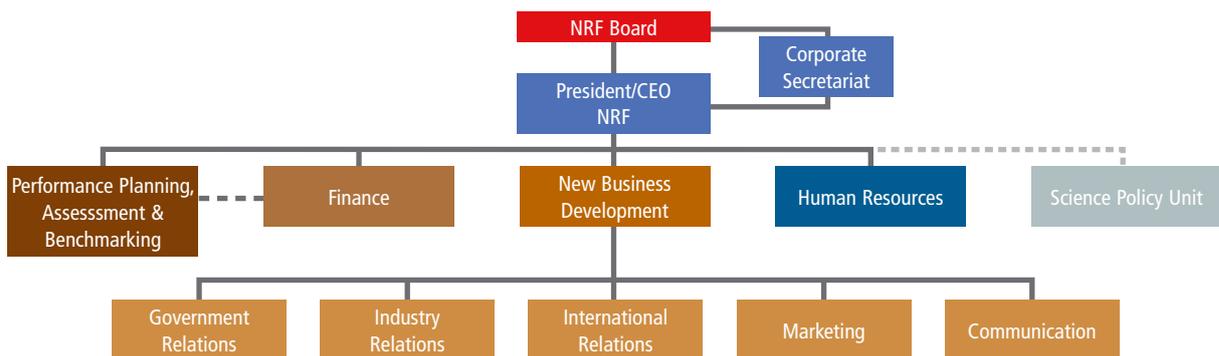


# Section C: Corporate office

## 1 Introduction

The NRF's Corporate office includes the following strategic and operational services:

- Governance;
- Finance;
- Human resources;
- New business development; and
- Performance planning, assessment and benchmarking.



## 2 Corporate governance

In terms of the National Research Foundation Act (No 23 of 1998), the NRF Board, appointed by the Minister of Arts, Culture, Science and Technology is responsible for providing strategic direction and for monitoring the compliance of the NRF with the legal and regulatory obligations that govern statutory bodies. The Board is therefore involved in providing strategic direction, approving the NRF budget and business plan, continuously monitoring its performance, and the signing off of the NRF Annual Board Report.

The appointment of the NRF Board for the period 1 July 2005 to 30 June 2008 has to be finalised during the course of 2005/06. The Board is supported by the Corporate Secretariat that will increasingly provide guidance with regard to governance issues.

With the transfer of SAASTA to the NRF and the declaration of the NZG as a National Research Facility, science outreach activities have become a core function of the NRF. This is not provided for in the NRF Act and a process to amend the Act needs to be embarked upon together with the DST.

While the Governance Framework for selected Public Sector Entities is being finalised, the NRF Board is giving special attention to its compliance with the Code of Corporate Practices and Conduct as set out in the King II Report.

The Board has appointed an Audit Committee and a Remuneration and Human Resources Committee to deal with relevant issues on a regular basis. All meetings of the Board and its committees, as well as for the NRF Executive, have been scheduled for 2005/06.

The NRF has an outcomes-based management approach and strives to continuously improve performance measures that can enhance appropriate regular performance reporting that is in accordance with the requirements of the respective principals and clients to whom the NRF provides a service.

# Section C: Corporate office

## 3 Corporate finance

The corporate financial function is responsible for ensuring that the NRF has, and maintains, effective, efficient and transparent systems of financial and risk management and internal control. It also ensures that the NRF takes effective and appropriate steps to prevent irregular expenditure, fruitless and wasteful expenditure, losses resulting from criminal conduct, and expenditure not complying with the operational policies of the NRF.

During 2005/06, the NRF will give special attention to managing funds allocated to, but not claimed by, research institutions. Unused funds will be re-allocated as soon as possible, ensuring that resources are used maximally. In addition, the most effective ways of delivering services within the framework of ring-fenced funds will be explored.

KPIs:	Effective financial accounting system Legal compliance Effective risk management Effective internal audit function
Expected outcome:	Well-controlled financial environment
Expected impacts:	Effective, efficient and transparent systems of financial management, enabling the achievement of the goals of the NRF Customer confidence

Key activities and targets are listed below:

Supporting objectives	Performance measures/outputs	Short-term target 2005/06	Longer-term target 2007/08
Recording of transactions on newly implemented financial system	Accurate and timeous financial information	Unqualified audit report	Unqualified audit report
Financial reporting	All financial reporting done in terms of legal requirements	All financial reports issued before deadline dates	All financial reports issued before deadline dates
Monitoring of internal control environment	Internal and external audit reports highlighting control weaknesses	Timeous follow-up of issues reported by internal and external auditors	Reduce number of audit report items by 50%
Effective and efficient utilisation of resources	Overall optimal running and salary expenses of the NRF	Reduced running expenses as per RISA business plan and optimisation of running costs as per the National Research Facilities' business plans	Reduced running expenses as per RISA business plan and optimisation of running costs as per the National Research Facilities' business plans
Risk assessment and management	Risk management plan for the NRF	Address all identified risk areas in internal and external audit plan	Reduced risks and improved management of existing risks

### Priorities for 2005/06

- Guaranteeing support from Corporate Finance to all business units to enable compliance with legal and regulatory requirements, thereby ensuring an unqualified Audit Report;
- Aligning the NZG with NRF financial policies and procedures based on a proper IT infrastructure;
- Ensuring BEE requirements are met through adherence to NRF and government procurement policies;
- Implementing fully a supply chain management for the NRF; and
- Increasing operational efficiencies to curb running costs, as a proportion of grants.

## 4 Corporate human resources and transformation

Committed and creative staff members are indispensable for attaining the goals of the organisation. In the South African context, the transformation of the composition of the workforce to ensure demographic representivity remains a priority.

KPIs:	Adequacy of staff profile (quality and quantity) Effective performance management Workforce harmony
Expected outcomes:	Productivity Staff commitment and satisfaction Internal institutional and attitudinal transformation Increased equity (in terms of race, gender and disability representation) Enhanced ability of the NRF to respond to global HR challenges, including HIV/AIDS
Expected impact:	Representative, productive workforce enabling the achievement of the goals of the NRF

The strategic role and scope of Corporate HR is to facilitate the acquisition, alignment, development and measurement of talent and human capital within the context of the NRF mission and objectives. More specifically, the task is to:

- Ensure that the NRF is able to attract the right number and quality of staff;
- Ensure the existence of programmes and interventions for development and skilling of staff;
- Ensure that staff are able to adapt to change and transformation within the context of the work of the NRF and the broader context of the country's agenda, including employment equity;
- Ensure development of improved and sustainable HR systems and processes;
- Contribute to the improvement in productivity through the implementation of performance management;
- Ensure that a harmonious and stable labour relations environment is created and maintained; and
- Show care and concern for the well-being of staff.

### Priorities for 2005/06

During 2005/06, Corporate HR will aim to:

- Complete the integration process of the NZG within the NRF, which includes a skills audit and skills development;
- Complete the realignment process of RISA within the improved operational mode and structure;
- Improve the recruitment processes and sourcing of individuals with combination skills sets required within the Innovation Fund and other specialised areas;
- Refine and further implement the NRF succession planning system and process;
- Further refine and improve the implementation of the NRF integrated performance management system;
- Facilitate corporate culture change and development within the context of the NRF's stated and desired values;
- Facilitate the implementation of the corporate HIV/AIDS strategy;
- Contribute to and work towards the achievement of employment equity targets and goals;
- Develop a strategy for employing people with disabilities in line with government policies;
- Maintain occupational health performance at a high level;
- Implement the new payroll and HR system;
- Create the IT infrastructure to convert most HR administration to electronic transactions; and
- Resolve post-retirement medical benefit liability.

# Section C: Corporate office

## Broad key activities and targets

Supporting objectives	Performance measures/outputs	Short-term target 2005/06	Longer-term target 2007/08
Staff acquisition, deployment, retention and succession planning and management	Turnover analysis	Turnover not to exceed national average of 10%	Turnover below national average
	Retention of key staff	Retention strategy	Implementation of retention strategy
	Placement strategy	60 days placement lead time	50 days placement lead time
	Right quantity and quality of staff available in right jobs within acceptable lead times	Effective succession planning system in place	Effective succession planning
Improved staff productivity, performance and effectiveness	Effective functioning. Performance Management System in place	Poor ratings not to exceed 5% of staff	Poor ratings below 5% of staff
	Training and skills development plan and interventions in place	Impact and effectiveness of plans and interventions implemented and acknowledged	Impact and effectiveness of plans and interventions implemented and acknowledged
Organisation development	Culture change programme in place	Effective culture change interventions implemented	Desired culture evident and acknowledged
	Organisational demographics	Overall 60% representation by blacks	Overall 65% representation by blacks
	Compliance with legislation	Representation per business unit plan by level and gender	Representation per business unit plan by level and gender
Care and concern for well-being of staff	Strategic review of needs	HIV/AIDS programme implementation	Full wellness programme implemented
	Wellness programme designed		

Competitiveness of an organisation is largely determined by the availability of suitably qualified staff. During 2005/06 the appropriateness of staff capacity will be assessed. The performance recorded for 2003/04 was as follows:

Entity	Number		Percentage	
	Master's	PhD	Master's	PhD
RISA (incl. SAASTA)	18 : 204	8 : 204	9%	4%
National Research Facilities (excl. SAASTA and SAEON)	21 : 438	31 : 438	5%	7%

## 5 New business development (including marketing, corporate communication and public relations)

In October 2004 the NRF appointed an Executive Director for New Business Development. This is undoubtedly a clear indication of the organisation's serious intent to grow its business.

The purpose of this function will be to lead, facilitate and support the NRF, through its various operations, to secure new business. The new business will primarily be in the form of new money channelled through the operations of the NRF, to strengthen its ability to deliver on its mandate. The new money may be for new or existing programmes or projects.

The directorate will include the following functions to enable it to fulfil its role:

- Communication;
- Marketing;
- International relations;
- Industry relations; and
- Government relations.

In performing these functions, the emphasis will be on **new business development**. Thus, the directorate will be active in scanning the terrain, creating the environment, exploring opportunities and preparing proposals for the establishment and resourcing of new initiatives as well as improved support and resourcing of existing initiatives. In some cases the directorate will take the lead in these exercises while in other cases it will support initiatives that will be driven by other members of management in the NRF. In conducting its business across the NRF, this division will be judged on its value addition.

### Challenges for 2005/06

During 2005/06, New Business Development will focus on:

- Developing and consolidating its function;
- Advancing the building of "one NRF" through integrated communication and marketing;
- Paying special attention to the NZG and its potential for edutainment;
- Advancing fund-raising for iThemba LABS on the MRMC project;
- Facilitating development of the funding proposal and raising funds for SAAO-Salticam;
- Finalising approval and funding for:
  - The Centres of Excellence in Industrial Research and Development (CEIRD) programme;
  - The Chairs in Entrepreneurship and Enterprise Development (CEED) programme; and
  - The Maths And Science Teachers' Training (MASTT) sub-programme of THRIP;
- Advancing discussion for more significant funding for high-level skills development;
- Engaging key stakeholders to raise the profile of the NRF and explore business opportunities; and
- Gaining good understanding of international opportunities and initiating access to these.

## 6 Corporate performance planning, assessment and benchmarking

The corporate function of performance planning, assessment and benchmarking is responsible for ensuring that the NRF has appropriate and transparent indicators to measure the performance of both individual business units and of the organisation in its entirety.

The function has to:

- Ensure the conceptual coherence between corporate strategic and business planning, continuous progress monitoring and eventual annual reporting to Parliament via the DST as line department;
- Ensure legal compliance with reporting requirements for public entities;

# Section C: Corporate office

- Explicate the high-level strategic alignment across the diverse functions of the NRF;
- Design and refine appropriate input, outcome and impact measures;
- Promote the application of performance measures in the business cycle of the organisation; and
- Provide information and interpretation that can be used as strategic management information for the organisation and the context in which it operates.

## Challenges for 2005/06

- Developing appropriate key performance indicators for the Innovation Fund in view of the numerous developments in the Fund;
- Obtaining comparable international benchmarks for specific aspects of the work of the NRF, eg, measurement of scientific output;
- Contributing to the design and improvement of a management information system; and
- Presenting meaningful analysis of longitudinal data to expose trends and enable strategic decision-making.

## Approval of the NRF Business Plan 2005/06 – 2007/08

Agreed to and signed by the Chairperson of the NRF Board and the President of the NRF



Prof BD Reddy  
Chairperson: NRF Board



Dr K Mokhele  
President: NRF

16 February 2005

## NRF corporate core missions and cross-cutting strategic priorities

The NRF 2005/06 – 2007/08 Business Plan is based on four core missions and six cross-cutting strategic priorities. A visual summary of the core missions, strategic priorities and high-level objectives, and how they relate to expected outcomes and impacts, is provided on page 5.

The four corporate core missions of the NRF are to develop and support:

- High-quality human resources in significantly increasing quantities;
- The generation of high-quality knowledge in prioritised areas that address national and continental development needs;
- The utilisation of knowledge, technology transfer and innovation to ensure tangible benefits to society from the knowledge created; and
- The provision of state-of-the-art research infrastructure that is essential to develop high-quality human resources and knowledge.

The six cross-cutting corporate strategic priorities are:

- Redressing and ensuring equity in race and gender;
- Adhering to quality;
- Internationalising research;
- Focusing on Africa;
- Positioning the NRF within the National System of Innovation (NSI); and
- Transforming the NRF organisationally.

## Rationale for adopting the core missions and strategic priorities

Several policy documents (among them South Africa's National R&D Strategy of August 2002) underpin the NRF corporate core missions and strategic priorities. Key illustrative arguments for adopting these missions and priorities as areas of key performance are outlined below:

### Corporate core missions

#### Human resource development

To ensure quality of life and wealth creation, South Africa has to transform itself into a knowledge society that competes effectively in the global system. For this transformation, highly skilled people are required in sufficient numbers to create, and impart to others, new knowledge and technologies, and to utilise and apply existing knowledge and technologies in innovative ways.

Given the mandate of the NRF, the key driver identified for the NRF is: *The production of large numbers of high quality PhDs to provide the bedrock for an innovative and entrepreneurial society.*

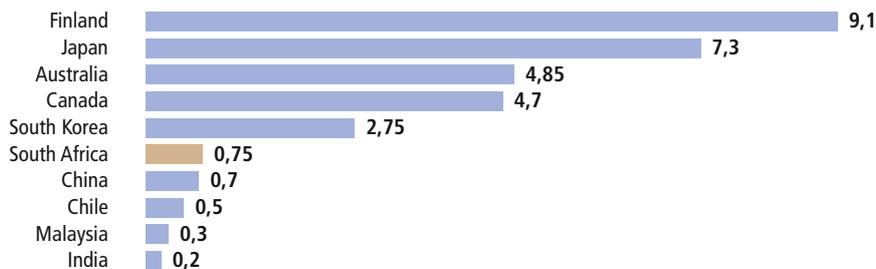
The current human resource capacity for research and innovation in South Africa is way below what the country requires to achieve its objectives. Some statistics on the available capacity include the following:

- From the *South African Innovation Key Facts and Figures* (Discussion Document, NACI, October 2003: 10) it is clear that most South Africans in the age group 20 and older have achieved only Grade 12 or lower, and only 8,4% have a qualification higher than Grade 12/Std 10.
- When comparing the number of researchers per 1 000 of the labour force, South Africa needs to improve its performance significantly to be competitive.
- 18,6 PhDs per million of population graduate in South Africa per annum, compared with 170 in Australia and 118 in Korea (NACI Report, 2002: 30-31);
- The potential R&D human resource capacity for research, technology development and innovation is also under threat. A major concern is the impact of HIV/AIDS which affects mainly young adults who are the capital base of knowledge

# Annexure A

generation and regeneration. In addition, the secondary school pass rates of learners with university exemptions in science and mathematics who enrol as students in science and engineering are unacceptably low. The recent addition of functions and facilities to the NRF – such as SAASTA and the NZG – affords the NRF unparalleled opportunities to influence the supply of human resources required for a knowledge society.

Figure 5: Number of researchers per 1 000 of the labour force



Source: WCY 2001/OECD/R&D Survey in NACI 2003: 22.

## Knowledge generation (research and development in prioritised areas)

Global competitiveness is dependent on new knowledge that delivers competitive advantage. South Africa produces, in terms of the Institute for Scientific Information (ISI) indexed articles, about 0,5% of the global published research output. Between 1997 and 1999, South Africa's citations per million of the population ranged between 81 and 87 citations (NACI Report, 2002: 26). When compared with Australia's 1 072 or Korea's 259, a significant improvement is called for. Knowledge generation in prioritised areas and shifting the boundaries of all knowledge domains are imperative for finding solutions to local and continental problems. National expenditure in R&D by major research fields is listed below:

Natural Sciences – 22,2%

Engineering Sciences – 20,0%

Applied Sciences and Technologies – 15,0%

Information, Computer and Communication Technologies – 12,9%

Social Sciences and Humanities – 10,6%

Medical and Health Sciences – 10,1%

Agricultural Sciences – 9,2%

(Reference: National R&D Survey, 2004: 3)

Through funding research in nine Focus Areas and at the National Research Facilities, the NRF promotes knowledge generation in all fields of science and technology, taking into consideration the national priorities, and complementing other knowledge generation initiatives.

## Utilisation of research results, technology transfer and innovation

Publicly funded science is regarded as a driving force behind technological and economic advancement. This implies that there should be a knowledge dissemination or transfer linkage between science and industry. Currently, only 10% of South Africa's economic growth is attributable to technological progress. High and medium technology exports still constitute only around 30% of total goods exported (NACI, 2003: 35). In comparison with other countries, South Africa is under-performing as regards the proceeds received from royalties and license fees (NACI, 2003: 28). South Africa's score on the Technology Achievement Index (TAI) developed by the United Nations Development Programme as a measure of technology development that includes measures of technology penetration in society is far from optimal. The country has a long way to go in creating an environment steeped in technology and geared toward innovation. NRF programmes that strive to promote the linkage between science and industry and near market innovations include THRIP and the Innovation Fund.

## Provision of state-of-the-art research equipment infrastructure

Equipment renewal to arrest the ageing of research equipment and the attendant marginalising of South Africa's scientific endeav-

ours is fundamental to the R&D strategy of the country. State-of-the-art research equipment is essential for technological innovation, training of highly skilled human resources and the ability of our scientists to conduct internationally competitive research.

## Corporate cross-cutting strategic priorities

### Redress and equity: race and gender

Within South Africa the only means to build a quality research system is to open access to all and thereby maximise the opportunity to develop a critical mass of researchers reflecting our demographic and cultural diversity. Equally, the sustainability of a quality-based knowledge system requires that it systematically creates opportunities for young people to enter and progress through the system.

Currently, 94% of the scientific publications recorded in the South African Knowledgebase (SAK) are authored by white researchers. South African Post-secondary Education (SAPSE) data indicate that women produce only 17% of the total research publications recorded (NACI Report, 2002: 27-28). Women researchers constitute 35,3% of the total of 8 661 FTE researchers (National R&D Survey, 2004: 3).

### Adherence to quality

To be competitive internationally, quality and excellence in the creation, application and transfer of knowledge may not be compromised. Hence, a fundamental principle for the NRF in exercising its mandate is that resources, be they for research, human resource development or expensive facilities, are made available to the research community on a competitive basis in a system where independent assessment of quality is a critical factor.

### Internationalisation of research

South Africa's goal of becoming competitive in the global economy requires professionals and intellectuals who are able to compete with the best in the world. It is the NRF's task to build the capacity of South African researchers to become leaders in the international research context. To achieve this, opportunities must be created for constructive international collaboration with researchers in the generation, transfer and exchange of knowledge.

### Focus on Africa

South Africa's fortunes are inextricably linked with the continent of Africa. Strategies to move South Africa onto a high-growth path cannot be achieved in isolation. NEPAD, which has the support of many of the developed countries, will undoubtedly create opportunities for the NRF to link up with special R&D interventions to optimise the competitive advantages of the region.

### Positioning the NRF within the National System of Innovation (NSI)

The NRF's mandate covers the entire spectrum of the innovation chain, from the most fundamental research to technology development. This, in addition to managing the National Research Facilities and its task to service the entire spectrum of disciplines, gives the NRF a unique and central role within the NSI. With the incorporation of SAASTA and the NZG, the NRF has consolidated its role as intermediary between science and society. The success of positioning the NRF within the NSI will depend both on the ability of the NRF to become a knowledge organisation servicing national needs and on its ability to leverage sufficient resources in pursuit of its mandate.

### Organisational transformation

There are a few critical elements in the strategy for transformation of the NRF:

- financial sustainability;
- improved business processes and procedures;
- organisational learning and growth; and
- human resources transformation that allows the organisation to benefit fully from the cultural and ethnic diversity in the country and thereby to attain employment equity.

# List of acronyms

AAAS	American Association for the Advancement of Science	IGS	International GPS Service
ACEP	African Coelacanth Ecosystems Programme	IKS	Indigenous Knowledge Systems
ACSI	Acquisition Camera and Science Imager	ILTER	International Long-Term Ecological Research
ACSI	All Catfish Species Inventory	ILRS	International Laser Ranging Service
AIDS	Acquired Immunodeficiency Syndrome	INTERMAGNET	INTERNational MAGnetic observatory NETwork
AISS	African Institute of Space Sciences	IPR	Intellectual Property Rights
ARC	Agricultural Research Council	ISI	Institute for Scientific Information
BEE	Black Economic Empowerment	ISIS	International Specimen Information System
BIPP	Business and Industry Partnership Programme	ISL	International Science Liaison
CBSG	Conservation Breeding Specialist Group	IT	Information Technology
CEED	Chairs of Entrepreneurship and Enterprise Development	iThemba LABS	iThemba Laboratory for Accelerator Based Sciences
CEIRD	Centres of Excellence in Industrial Research and Development	KFD	Knowledge Field Development
CoEs	Centres of Excellence	KISC	Key International Science Capacity
CoP	Communities of Practice	KMS	Knowledge Management System
COSPAR	Committee on Space Research	KM&S	Knowledge Management and Strategy
COTII	Council of Trade and Industry Institutions	KPAs	Key Performance Areas
CSIR	Council for Scientific and Industrial Research	KPI	Key Performance Indicator
DACST	Department of Arts, Culture, Science and Technology	KPIs	Key Performance Indicators
DEAT	Department of Environmental Affairs & Tourism	LTER	Long-term Ecological Research
DIDBase	Digital Ionosonde Database	MASTT	Mathematics and Science Teachers' Training
dIdD	delta Inclination delta Declination	MCDM	Multi-criteria Decision Model
DoC	Department of Communication	MCM	Marine and Coastal Management
DoE	Department of Education	MD	Managing Director
DoL	Department of Labour	MoU	Memorandum of Understanding
DFA	Department of Foreign Affairs	MRMC	Major Radiation Medicine Centre
DST	Department of Science and Technology	MSc	Master of Science
dst	disturbance storm time	MTEF	Medium-term Expenditure Framework
ED	Executive Director	NACI	National Advisory Council on Innovation
ELTOSA	Environmental Long-Term Observatories of Southern Africa	NASA	National Aeronautics and Space Administration
EU	European Union	NASA JPL	NASA Jet Propulsion Laboratory
FAO	Food and Agriculture Organisation	NASA GSFC	NASA Goddard Space Flight Center
<sup>18</sup> FDG	Fluorine-18 = FluoroDeoxyGlucose	NASSP	National Astrophysics and Space Science Programme
FEST	Foundation for Education, Science and Technology	NCP	National Contact Point
FGE	Fluxgate Magnetometers	NEPAD	New Partnership for Africa's Development
FP	Framework Programme	NGO	Non-governmental Organisation
FRD	Foundation for Research Development	NINA	Norwegian Institute for Nature Research
GBIF	Global Biodiversity Information Facility	No.	Number
GFZ	GeoForschungsZentrum	NOSA	National Occupational Safety Association
GINs	Geomagnetic Information Nodes	NRF	National Research Foundation
GM	General Manager	NSFAS	National Student Financial Aid Scheme
GPS	Global Positioning System (a constellation of satellites for measuring precise positions on Earth)	NSI	National System of Innovation
HartRAO	Hartebeesthoek Radio Astronomy Observatory	NZG	National Zoological Gardens
HDI	Historically disadvantaged institution	p.a.	per annum
HALCA	Highly Advanced Laboratory for Communication and Astronomy	PAAZAB	Pan African Association of Zoological, Aquarium and Botanical Gardens
HEI	Higher Education Institution	PAST	Palaeo-anthropology Scientific Trust
HEQC	Higher Education Quality Committee	PBMR	Pebble Bed Modular Reactor
HESS	High-energy stereoscopic system	PCST-7	7th International Public Communication of Science and Technology Conference
HET	Hobby-Eberly Telescope	PET	Positron Emission Tomography
HIV	Human Immunodeficiency Virus	PFIS	Prime Focus Imaging Spectrograph
HMO	Hermanus Magnetic Observatory	PhD	Doctor of Philosophy
HOIA	Hermann Ohlthaver Institute for Aeronomy	PMS	Performance Management System
HR	Human Resources	PUB	Public Understanding of Biotechnology
HSRC	Human Sciences Research Council	PUSET	Public Understanding of Science, Engineering and Technology
IAEA	International Atomic Energy Agency	PVM	Proton Vector Magnetometer
IAU	International Astronomical Union	R&D	Research and Development
IBSA	India, Brazil, South Africa	RCD	Research Capacity Development
ICD	Institutional Capacity Development	RDS	Research Development and Support
ICEFISH	International Collaborative Expedition to collect and study Fish Indigenous to Sub-Antarctic Habitats	REDIBA	Research Development Initiative for Black Academics
ICGEB	International Centre for Genetic Engineering and Biotechnology	RI	Research Information
ICSU	International Council for Science	RISA	Research and Innovation Support and Advancement
ICT	Information and Communication Technology	ROI	Return on Investment
IFCO	Innovation Fund Commercialisation Office	RPS	Research Promotion and Support
IFIP	International Federation for Information Processing	RTCC	Research and Technology Collaboration Centre
		S&T	Science and Technology
		SAAO	South African Astronomical Observatory

# List of acronyms

SAASTA	South African Agency for Science and Technology Advancement	SHARE	Southern Hemisphere Auroral Radar Experiment
SABI	South African Biosystematics Initiative	SKA	Square Kilometre Array
SABIF	South African Biodiversity Information Facility	SLA	Service level agreement
SABS	South African Bureau of Standards	SLRS	Satellite Laser Ranging System
SACAA	South African Civil Aviation Authority	SMMEs	Small, medium and micro enterprises
SADC	Southern African Development Community	SMT	Science, Mathematics and Technology
SAEON	South African Environmental Observation Network	SSC	Separated Sector Cyclotron
SAIAB	South African Institute for Aquatic Biodiversity	SS&H	Social Sciences and Humanities
SAK	South African Knowledgebase	STAC	Science and Technology Agreements Committee
SALT	Southern African Large Telescope	TAI	Technology Achievement Index
SALTICAM	SALT verification and acquisition instrument	TEC	Total Electron Content
SANAP	South African National Antarctic Programme	the dti	Department of Trade and Industry
SANBI	South African National Biodiversity Institute	THRIP	Technology and Human Resources for Industry Programme
SANCOR	South African Network for Coastal and Oceanic Research	TIPTOP	Technology Innovation Promotion through the Transfer of People
SANDF	South African National Defence Force	UN	United Nations
SAPSE	South African Post-secondary Education	UNISA	University of South Africa
SASCON	South African Science Communication Network	VLBI	Very Long Baseline Interferometry
SAUVCA	South African Universities Vice Chancellors' Association	VSOP	Very Long Baseline Interferometry Space Observatory Programme
SC	Science Council	WAZA	World Association of Zoos and Aquariums
SET	Science, Engineering and Technology	ZASat	South African Scientific Satellite
SETIs	Science, Engineering and Technology Institution		

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