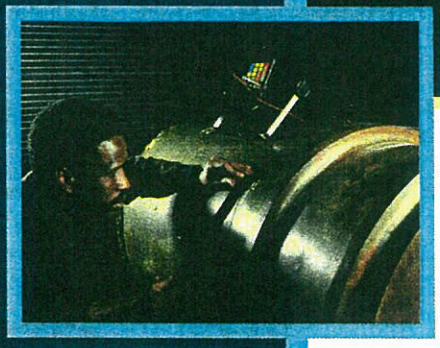
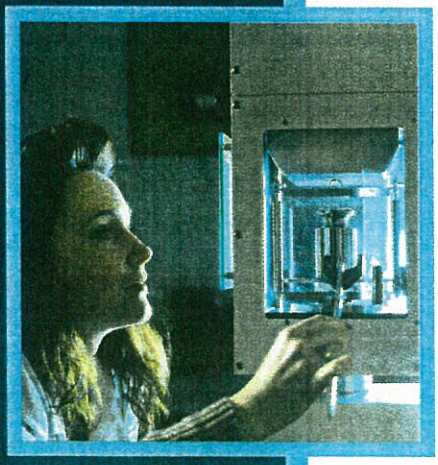
CSIR 1997



ANNUAL REPORT



CSIR

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June 1997

CONTENTS

OUR MISSION

THE CSIR IS A UNIQUELY SOUTH AFRICAN ORGANISATION, COMMITTED TO INNOVATION. WE PROVIDE TECHNOLOGY SOLUTIONS AND INFORMATION TO SUPPORT SUSTAINABLE DEVELOPMENT AND ECONOMIC GROWTH IN THE CONTEXT OF NATIONAL PRIORITIES.

OUR VISION

TO BE THE BEST IN TECHNOLOGY, LEADERSHIP AND PARTNERING, AND – THROUGH OUR PEOPLE – FIGHT POVERTY, BUILD GLOBAL COMPETITIVENESS AND MAKE AN ENDURING DIFFERENCE IN PEOPLE'S LIVES.

CHAIRMAN'S REVIEW

Dr Bill Venter
Chairman

DURING THE PERIOD UNDER REVIEW, THE CHALLENGES OF GLOBALISATION, TOGETHER WITH THE INCREASING REALISATION THAT INTELLECTUAL CAPITAL DRIVES ALL COMPETITIVENESS, HAVE CONTINUED TO MAKE THE CSIR EVER MORE RELEVANT AND RESPONSIVE TO THE DIVERSE NEEDS OF ITS MANY CLIENTS AND STAKEHOLDERS WITHIN THE SOUTH AFRICAN NATIONAL SYSTEM OF INNOVATION AND THE CORRESPONDING DEMANDS OF ONGOING TRANSFORMATION OF OUR SOCIETY.

In addressing the challenges of the new South Africa, the CSIR has embarked upon an evolutionary process of realignment to new realities. In so doing the organisation unambiguously seeks to lead in providing a comprehensive range of technological solutions and information, acting in partnership with all its various constituencies. As an internationally-recognised contract science and technology organisation, we aim to leverage the national effort to achieve sustainable development and economic growth in realising our nation's goals and priorities.

Mr Les Boyd

Prof Anton Eberhard

Dr Dhiro Gihwala

Dr Ivy Matsepe-Casaburri

To this extent the important outputs and priorities signalled in the recent White Paper on Science and Technology have framed the organisation's own strategic priorities: helping to promote competitiveness and the creation of employment; enhancing the quality of life of all our people, with specific attention to the role of technology in helping to meet basic needs; contributing appropriately to the development of our nation's human resource potential, with an emphasis on science and technology; seeking to support and catalyse environmental sustainability for the longer-term health of our nation and sub-continent; and responding with vigour to the exciting but nevertheless complex and challenging demands of promoting an information society in South Africa.

The CSIR's Technology Impact document, a companion to this Annual Report, summarises many of the significant initiatives and activities that the CSIR has contributed across the broad spectrum of the needs of the South African economy and its people.

Operationally, the CSIR has performed impressively against the set targets. Financial performance, despite the background of continued market turbulence, has been good. The organisation's morale is positive and constantly improving. Some remarkable progress has been

In addressing the challenges of the new South Africa, the CSIR has embarked upon an evolutionary process of realignment of new realities. In so doing the organisation unambiguously seeks to lead in providing a comprehensive range of technological

solutions and information acting as a partner to all its various constituencies.

made in the transformation arena. The organisation strives for customer satisfaction by initiating and maintaining high levels of quality and service. Key stakeholder reaction to the CSIR, particularly with our various political constituencies, has enhanced considerably. Development initiatives are progressing and CSIR-wide interventions and pilots in the information/IT arena are making a real difference, both in organisational effectiveness and in new and improved value-added products and services.

In this latter regard, by way of example, the strong emergence of the information technology revolution has brought with it an awareness of the need for community-based information services and the vital role played by information technology in enhancing the lives of all our people. The CSIR is increasingly being seen as a key source of this expertise in Southern Africa. Current projects focus on addressing a range of the needs of people, while simultaneously encompassing a number of aspects of community life, such as social and economic empowerment and recreational needs.

Similarly, providing education over distance is an innovative way of reaching people more cost effectively, and overcomes the restrictions of a teacher resource required to train large numbers of scholars in specialised disciplines. In the spirit of partnering, which increasingly characterises the CSIR's way of doing business, a consortium has been formed, with the CSIR as a founder member, consisting of major players in telematics and distance education, in order to help put in place the structures necessary to rapidly assimilate the benefits of this exciting new technology.

Under the dedicated and competent leadership of our President Dr Geoff Garrett, coupled with the support of his top management team and the committed contribution of our highly competent and well qualified staff, we are enhancing the lives of all South Africans.

I am confident that the CSIR will play its role to build South Africa into a "powerhouse" and to demonstrate that people of diverse race, tradition and culture can live in harmony and build an economy, the products and services of which will compete with those of any nation in the world. Ours is a culture that is grounded on the values of integrity, empowerment and decency and therefore the traits of risk, tolerance, innovation, imagination and creativity are actively encouraged.

Mr Khomotso Phihlela

Prof Friedel Sellschop

Ms Lyndall Shope-Mafole

Prof Errol Tyobeka

Mr Eugéne van As

CHAIRMAN'S REVIEW

(CONTINUED)

Controlling alien vegetation is a most cost effective method of sustaining water supply, according to studies conducted by the CSIR, which showed that where alien plants were controlled, water could be delivered more cost-effectively.

Whilst I am greatly honoured to chair the CSIR's Board, I am also appreciative of the insightful and substantial contributions of my fellow Board members. It behoves me to thank them most sincerely for their significant assistance during the period under review. My thanks also go to all the men and women of the CSIR who have contributed so meaningfully to the excellent results for this past year. Striving for total customer satisfaction, in all of the markets we serve, shall continue to be a prime focus for the CSIR.

As we aggressively pursue our mission we are sincerely grateful for the support of our valued clients and suppliers, for the dedication of our management and for the trust and encouragement of our stakeholders.

The CSIR remains a key strategic science and technology institution that will continue to create, acquire, diffuse and put into practice innovative solutions to help the country and its people achieve their individual and collective goals. I am proud to be a part of it.

Dr W P Venter
CHAIRMAN

11 June 1997

HIGHLIGHTING SOME ACHIEVEMENTS

SOME CONTRACTS HIGHLIGHTS

- Joint venture development of housing and urbanisation information system with SPL (Dimension Data Group)
- Performance enhancement of wireless local loops for Ericsson for rapid deployment of telecommunication services in *inter alia* disadvantaged communities
- Installation of Internet service for Zambian Telecommunication Company
- Funding obtained from Universities of California, Berkeley and Nevada for using 3D stress sensor to measure typical truck tyre stress footprints for input into structural analysis of experimental roads in California and Nevada
- First strategic involvement in air space control and air defence for SAAF and SANDF
- Audit of SMME and labour intensive contracts for Department of Public Works
- First major international contract for the medium speed windtunnel
- New black-owned outsourcing venture for supplying vinyl tonneau covers established and incubated at the CSIR
- Development of a decision support system to facilitate the formulation of land development objectives of the greater Pretoria Metropolitan Council
- Contributed, with Denel Aviation, to gas turbine engine component upgrade project for international application

AWARDS

• CSIR award winners of the Technology Top 100 Competition, organised by Engineering Week in conjunction with The Engineering Association, included the CSIR's Division of Materials Science and Technology (Mattek) as the winner of the Research and Development category and Aeroflo (an Atomic Energy Corporation/CSIR joint venture company) as the winner of the Materials and Manufacturing (Products and Processes) category. An adjudicators' special commendation, awarded for the first time by members of the Technology Top 100 adjudication panel, also went to the Division of Materials Science and Technology for excelling in research that has widespread industrial applicability.

Dr Neville Comins (Director of Mattek), Brigitte Mabandla (Deputy Minister: Arts, Culture, Science and Technology) and Dr Roy Marcus (Engineering Association).

• On 13 June 1996, it was announced that SeamCam and the Mine Hoist Cage Door, both products developed by the CSIR's Division of Manufacturing and Aeronautical Systems Technology (the latter in conjunction with JCI) and EVERBOND, a product developed by the Division of Mining Technology, were three of the ten finalists in the 1996 Top Products competition.

(Back row) Werner Merbold, Roel Stolper, Braam le Roux, Dr Daan Toerien, and (front) André Nourse of the CSIR's SeamCam team with their award.

David Bath, Director of Boutek, Carl Schlotfeldt and Arthur Coy, Chief Executive of Murray & Roberts Construction.

• **The 1996 JD Roberts Award** – that recognises technical research that assists the delivery of RDP-related projects – was presented to Carl Schlotfeldt of the CSIR's Division of Building Technology (Boutek), who was also unanimously nominated by the division's management team for his leadership role in aligning their research with the needs of housing in South Africa.

• The stope support design methodology, developed by the CSIR's Division of Mining Technology, was judged one of the 20 top products in the "Best of the Best" competition organised by Engineering Week in conjunction with the Engineering Association.

HIGHLIGHTING SOME ACHIEVEMENTS

(CONTINUED)

TURNOVER TRENDS

(R million)			Annual growth		Annual growth		Annual growth
31 March	1994	1995	%	1996	%	1997	%
Turnover	492	497	1	562	13	641	14
Parliamentary grant	240	233	(3)	260	12	304	17
Contract income	251	261	4	300	15	334	11
Private sector	134	149	11	171	15	181	6
Public sector	55	49	(11)	47	(4)	46	(2)
National safety and security sector	52	47	(10)	61	30	78	28
Other sectors (including Africa)	10	16	60	21	31	29	38
Royalties	1	3	200	2	(33)	3	50
Turnover/Manpower cost	1,89	1,84	(3)	1,93	5	1,97	2

SOME CONTRACTS HIGHLIGHTS *(continued)*

- Installation of first community information development system in Africa at the University of Dar es Salaam
- Update of Red Book guidelines for engineering services and amenities in residential communities
- Support of water supply and sanitation project in Eastern Cape for Department of Water Affairs and Forestry in association with UK-based HR Wallingford
- Conducting air quality study for Uruguayan government (with ESKOM and Uruguayan company LATU)
- Agreement with national Cancer Institute in USA to transfer world-class anti-cancer screening technology to CSIR
- CSIR's Hermanus Magnetic Observatory contracted to supply orientation magnetometer for the German SAFIR 2 satellite
- Commercialised NetSec computer networking system which provides secure routing and fire walling for Internet connectivity
- Involvement in European Union renewable energy projects
- Packing hall productivity improvement
- Utilisation of neutralisation technology project
- Effects of truck and tyre pressures on design of flexible pavements in SA for SA Roads Board
- Development of remote diagnostics capability for X-ray spectography machines
- Development of thermal barrier coatings for diesel engine applications
- CSIR tree improvement team developed and released 60 eucalypt clones nationally and internationally
- Team effort launch of motor-cycle composite racing wheel at international motor show in Germany

Janice Dewar, Dr Petro Terblanche and Dr Jocelyn Webster signing the EUDGX11 contract on behalf of Foodtek

SOME CONTRACT STORIES

• The Division of Food Science and Technology chalked up a first for the CSIR by obtaining funding from the European Union (EU) through cooperation with Third Countries Programme of the Directorate General XII (DG XII), for a joint research project entitled: "The Improvement of the Protein Quality of Sorghum and its Introduction into Staple Food Products for Southern and Eastern Africa".

• The CSIR's Satellite Applications Centre at Hartebeesthoek supported one of the most ambitious and important satellite launch programmes of recent times, of which the first three satellites were scheduled to be launched during December 1996 on board the very reliable DELTA rocket launcher, from Vandenburg Air Force Base in California. These rocket launchers were developed by McDonnell Douglas, one of the most prominent aerospace companies in the world.

• A contract was signed by the Division of Environment, Water and Forestry Technology (Environmentek) to support the Industrial Technology Research Institute (ITRI) of Taiwan through transferring skills and expertise in industrial water conservation by way of formal training courses and participatory training, including visits to various industries.

Dr Tienie van Vuuren, CEO of Safcol, and Anthos Yannakou, Director of Environmentek, CSIR.

• The South African Forestry Company Limited (Safcol) and Environmentek have entered into a tree-improvement R&D partnership to develop and align strategies that will meet the raw material market needs of the sawlog industry.

CSIR'S NINE DIVISIONS

AEROTEK: MANUFACTURING AND AERONAUTICAL SYSTEMS TECHNOLOGY
BOUTEK: BUILDING TECHNOLOGY
ENVIRONMENTEK: WATER, ENVIRONMENT AND FORESTRY TECHNOLOGY
FOODTEK: FOOD SCIENCE AND TECHNOLOGY
MATTEK: MATERIALS SCIENCE AND TECHNOLOGY
MIKOMTEK: INFORMATION AND COMMUNICATIONS TECHNOLOGY
MININGTEK: MINING TECHNOLOGY
TEXTEK: TEXTILE TECHNOLOGY
TRANSPORTEK: ROADS AND TRANSPORT TECHNOLOGY

OUTSTANDING ACHIEVERS

• **The CSIR proudly salutes the 1996 Outstanding Achievers for their excellence, dedication and commitment. The awards went to five individuals and four teams:**

Cottesloe Rope Testing Team

Cottesloe Rope Testing Team (Mattek): *(back row)* Hannetjie Sauer, John Moore, Rodgers Maluleke, July Baloyi, Solly Khabo, Timothy Mlotshwa, Peter Carter, Sabine Annear, *(middle row)* Lorna Uithaler, Edward Madibane and *(front)* Schoeman Mathipa, David Ndou and Phineas Baloyi. Acknowledged for maintaining a cost-effective quality service – annually testing 3 000 to 5 000 statutory and non-statutory mine ropes – irrespective of peaks and troughs in the mining industry.

National Health Facilities Audit Team

National Health Facilities Audit Team: *(back row)* Pieter Liebenberg, Frederick Mentz, Lourens du Preez, Dirk Conradie, *(front row)* Geoff Abbott, Lily Enslin and Christa Conradie. Acknowledged for their superior delivery on brief, on budget and on time on the national health facilities audit for the Department of National Health, which now provides an invaluable basis for planning major capital investment programmes in health facilities throughout the country.

Lucas 28RA Relay Team

Lucas 28RA Relay Team (Aerotek): *(left to right)* Nico Kruger, Bert Meyer, Boyse Pillay, Lofty Deysel, Joe Bellingham, Wilson Shibambo, Louis Kaltenrieder, Hennie Pretorius, Geoff Garrett (CSIR President), Aaron Mabena, Phil Schoeman, Graham Parkin, Timothy Zimu and Alan Webb. In a first of its kind project undertaken by the CSIR, the team participated in a multi-disciplinary international effort to establish a unique small business that produces automotive relays to world-class standards.

Corporate Audit Services Team

Corporate Audit Services Team: *(left to right)* Johan Hattingh, Annatjie Orsmond, Berlina Moroole, Ronel Dijksman, Nols Brits, Aldi Barnes and Thabo Pooe with Geoff Garrett (CSIR President) in the background. Insert: Marianne de Lange. Received recognition for the efficient and effective way of dealing with the many issues that could have constituted major distractions of incurred costs for the CSIR, and great support to the line function of the organisation.

HIGHLIGHTING SOME ACHIEVEMENTS *(CONTINUED)*

SOME CONTRACTS HIGHLIGHTS *(continued)*

- Assessment of potential impacts on downstream sections of the Okavango River in Northern Namibia
- Study for United Nations Economic Commission on science and technology in Africa
- Breathable rainwear contract for defence force
- Numerical prediction of heat transfer for turbine blades
- Consolidation of housing subsidy management system
- Received first Netherlands' order for Rubfix, repair compound used to repair conveyor belts such as those used in mines
- Development of cadmium mercury telluride epilayers for infrared detector applications
- Joint venture with L&W Environmental for environmental impact assessment for a fertiliser plant
- Assistance to Japanese Aid Agency and Tetra Ltd in rehabilitation of Port of Beira
- Development of road, bridge and rehabilitation design standards and specifications
- First heavy vehicle simulator exported to the USA
- Participating as one of eight international laboratories to develop a universal reference strength tester for HVI, the most important textile fibre worldwide
- Investigation of pump shaft failures
- Analysis of meat and animal products for residues of pesticides and veterinary drugs
- Forestry site classification and evaluation for plantations in Mpumalanga and Northern Province
- Investigation of user acceptability of environmentally friendly all purpose detergent for sanitation of latrines at schools in developing communities
- Facilitation, with Northwest Development Corporation and provincial government, of establishment of technology demonstration and small enterprise support centre

Henry Davids *(Environmentek)*: acknowledged for his key contributions to the development of a Geographical Information System (GIS) capability within his division and the leadership role he has taken in promoting science awareness in schools.

Henry Davids

Warren Miglietti

Warren Miglietti *(Mattek)*: an internationally recognised expert in high-technology joining techniques, he was acknowledged for his contribution to the proactive alignment of some of his division's activities to a client's focus on maintainability rather than replacement, which ensured increased revenue for the division.

Rodney Milford *(Boutek)*: acknowledged for his sustained contributions of excellence to the built environment, decision support and policy in fields including wind engineering, structural safety and reliability, seismic loading of structure, non-linear finite element techniques and land-use planning and management.

Rodney Milford

Brian van Wilgen

Brian van Wilgen *(Environmentek)*: acknowledged by Minister Kader Asmal for his key role in the success of the Department of Water Affairs and Forestry's *Working for Water* programme, which has been measured in terms of water yield from previously dry rivers and the tremendous social benefits to communities, such as reduced unemployment and crime rates and improved payment for services.

Jocelyn Webster *(Foodtek)*: recognised for her primary role, together with other Foodtek staff and a national and international consortium of research and development (R&D) organisations, in obtaining the first-ever contract for the CSIR with the European Union DGII, for development work aimed at building capacity and contributing to food security.

Jocelyn Webster

CELEBRATIONS

- In September 1996, the Fishing Industries Research programme (FIRI) of the Division of Food Science and Technology celebrated 50 years of successful research and development.

- The CSIR's National Metrology Laboratory (NML), which was established in 1947, celebrates its 50th anniversary this year. With the formation of SADCMET in October 1996, the NML has become a key role-player in metrology in the Southern African region.

Dr Frank Nabarro and Heidi Filmer

Nicoline Basson, author of Passage to Progress, with Dr Brian Clark, past President of the CSIR

Photographs: Pretoria News

A team of CSIR Mindwalkers

LAUNCHES

- Dr Frank Nabarro, a CSIR Fellow, and Heidi Filmer of the Division of Materials Science and Technology, launched their book entitled "The Physics of Creep" in March 1996.

- In November 1996 the CSIR launched a specially commissioned book to commemorate its 50th anniversary in 1995. The book, called *Passage to Progress*, takes a brief look at the dawn of technology in Africa, its subsequent progress and the CSIR's role in its development.

- The CSIR Mindwalk 1997 competition – extended to include five major metropolitan areas: Pretoria, Johannesburg, Durban, Port Elizabeth and Cape Town – was launched in February 1997.

- In a new scholar awareness of R&D programme, pupils from Riversdale and Stellenbosch assisted the Division of Environment, Water and Forestry Technology in collecting important information on tidal rivers at the Kaffirkuils Estuary in Stilbaai.

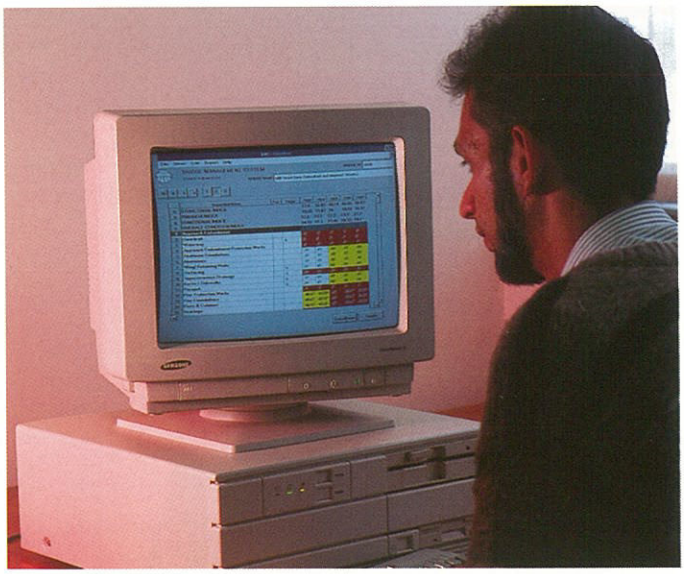
- The CSIR and Rapid Design Technologies (Pty) Ltd (RDT) have launched a Time Compression Technologies Centre which consists of the CSIR's Product Development Centre and its Mould Technology Centre, combined with the rapid tooling and stereolithography expertise from RDT.

VISITORS

- More than 145 000 people visited the CSIR site in Pretoria during the year. The profile of the visitors ranged from scholars to Cabinet Ministers and the 32nd National Science Week Winners. In addition the CSIR hosted delegations from Hungary, Sweden, Italy, Ethiopia, Israel, UK, Botswana, Australia, Thailand, France, USA, Poland, the Netherlands, Pakistan, Republic of China, Japan, the European Business Forum and local representatives of the World Bank.

INNOVATION PERMEATES THE CSIR'S OPERATING CULTURE AND HIGHLIGHTS THE UNIQUE ABILITIES OF OUR PEOPLE TO FIND SOPHISTICATED YET APPROPRIATE SOLUTIONS TO IMPROVING QUALITY OF LIFE FOR EVERYONE. THE EXAMPLES ON THESE PAGES DEMONSTRATE THE COMMITTED CONTRIBUTION OF OUR PEOPLE IN ACTION IN THEIR QUEST TO DELIVER HIGH-QUALITY, VALUE-ADDED PRODUCTS AND SERVICES TO OUR CLIENTS AND STAKEHOLDERS.

MANAGING BRIDGE STRUCTURES



Transportek in conjunction with consultants Stewart Scott Inc have developed a bridge management system for the Taiwan Area Freeway Bureau. The system is being upgraded for the Cape Town Metro Council and for Spoornet which owns about 3 500 bridge structures.

FAST-TRACKING PRODUCT DEVELOPMENT

Fast-tracking product development from design to market stage is the aim behind the Time Compression Techology Centre (TCT) at Mattek. The centre evaluates, selects masters and demonstrates the latest technologies in rapid product development and transfer them to the manufacturing industry.

ASSESSING FIRE DAMAGE

Photo: Courtesy of the Pretoria News

Boutek was part of the team that performed the forensic investigation into the cause of the fire to the Munitoria building in Pretoria in March 1997. A structural stability assessment of the building after the fire was conducted and recommendations were made on which parts of the building should be demolished.

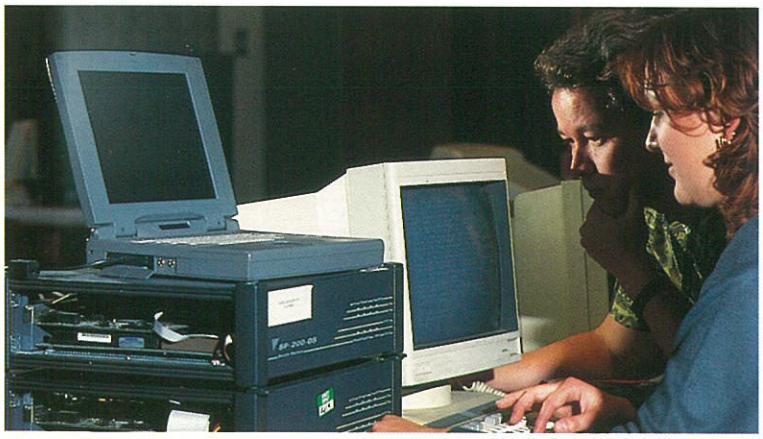
STITCH IN TIME

Hand weaving, spinning, dyeing, fabric finishing, product design, sewing and machine knitting, are all vocational skills training programmes for the informal and small enterprise sectors offered by Textek.

ASSISTING WITH SHELTER

Through the People's Housing Process, Boutek's shelter group assists individuals, families and groups within communities to build their own homes with an appropriate level of support. In order to provide communities with information on housing, the group is developing a series of publications called Shelter Talk, which will be distributed through the Housing Support network.

PROVIDING NETWORK SECURITY

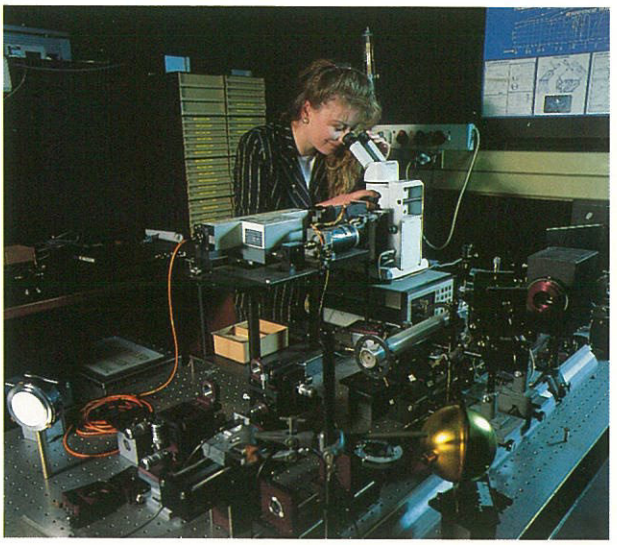


Mikomtek provides a full suite of network consulting services ranging from auditing, planning and design to systems for information and communications security and privacy. It is also involved in continued development of a state-of-the-art secure router firewall system which it initially developed and has now commercialised with a private sector partner. This system provides controlled connectivity between a private network (LAN) and the Internet, as well as allowing for private information to be transmitted over the Internet through encryption of the information.

MONITORING SAFETY EQUIPMENT

Miningtek has introduced a Self-Contained Self-Rescuer (SCSR) monitoring programme for the mining industry to detect adverse trends in the performance of SCSRs.

MAINTAINING MEASUREMENT ACCURACY



The National Metrology Laboratory within Aerotek maintains the highest measurement accuracy in the country. Services include: maintaining national measuring standards; calibrating instruments against these standards; developing new measuring standards; and providing technical problem solving.

DEVELOPING BUSINESS OPPORTUNITIES

Extracting liquorice block in the natural products extraction plant at Foodtek. The extraction of high value chemical products from plants has been identified as a small business opportunity at Dysseldorp near Oudtshoorn where the liquorice plant grows wild. Foodtek is assisting the community in developing a business making liquorice from its roots.

ASSESSING IMPACTS

Environmentek assessed the cumulative impacts of the proposed industrial development zone and harbour at Coega near Port Elizabeth.

CSIR

ANNUAL FINANCIAL STATEMENTS

REPORT BY THE AUDITOR-GENERAL

FOR THE FINANCIAL YEAR ENDED 31 MARCH 1997

1. AUDIT ASSIGNMENT

The group annual financial statements of the CSIR, set out in pages 14 to 52 have been audited in terms of Section 3 of the Auditor-General Act, 1995 (Act No. 12 of 1995), read with Section 14(1) of the Scientific Research Council Act, 1988 (Act No. 46 of 1988). These annual financial statements and the maintenance of effective control measures are the responsibility of the President of the CSIR. My responsibility is to report on these annual financial statements and the matters stipulated by the first-mentioned Act.

2. REGULARITY AUDIT

2.1 Financial

(a) Nature and scope: The audit was carried out in accordance with generally accepted governmental auditing standards. These standards require the audit to be planned and performed so as to obtain reasonable assurance that, in all material respects, fair presentation is achieved in the annual financial statements. An audit includes an evaluation of the appropriateness of the accounting policies, an examination on a test basis, of evidence supporting the amounts and disclosures included in the financial statements, an assessment of the reasonableness of significant provisions and a consideration of the appropriateness of the overall presentation of the annual financial statements. I consider that the audit procedures were appropriate in the circumstances to enable me to express the opinion presented below.

(b) Audit opinion: In my opinion these annual financial statements fairly present the financial position and the results obtained by the CSIR as at 31 March 1997 in accordance with generally accepted accounting practice applied on a basis consistent with that of the preceding year. Furthermore, in my opinion, the information furnished in terms of Sections 6 and 7 of the Reporting by Public Entities Act, 1992 (Act No. 93 of 1992) is fair in all significant respects and where applicable, on a basis consistent with that of the preceding year.

Quality Electronics Development (Pty) Ltd was not consolidated, because the Board of the CSIR is of the opinion that it will be of no real value to the users of the annual financial statements in view of the insignificant amounts involved, and I concur with this decision.

2.2 Compliance

The CSIR's functions are determined by the Scientific Research Council Act, 1988 (Act No. 46 of 1988) and as a listed public entity it is subject to the provisions of the Reporting by Public Entities Act, 1992 (Act No. 93 of 1992). Compliance with this and other appropriate legislation was audited on a test basis.

2.3 Audit observations

In my opinion:

- the transactions of the CSIR that came to my notice in the course of my examination were made in accordance with the applicable laws and instructions;

and

- the transactions that came to my attention during auditing were in all material aspects in accordance with the mandatory functions of the CSIR as determined by law or otherwise.

3. APPRECIATION

The courtesy extended and assistance rendered by the CSIR's personnel during the audit is greatly appreciated.

G R Witthöft
for AUDITOR-GENERAL

Pretoria
17 June 1997

EXECUTIVE REPORT

Dr Geoff Garrett
President

Albert Jordaan
Executive Vice-President: Finance and Marketing

Dr Namane Magau
Executive Vice-President: Human Resources

Neo Moikangoa
Executive Vice-President: Technology for Development

Dr Adi Paterson
Executive Vice-President: Technology and Policy

AS SOUTH AFRICA APPROACHES THE NEW MILLENNIUM, THE FORCES THAT HAVE SHAPED OUR RECENT PAST APPEAR SET TO MOULD OUR FUTURE. AMONG THESE, TWO ARE UNPARALLELED: THE ONGOING PROCESS OF GLOBALISATION AND THE EXPONENTIAL GROWTH IN AND THE PERVASIVENESS OF THE IMPACT OF TECHNOLOGY. IN RESPONSE, THE GOVERNMENT'S NATIONAL POLICY ON SCIENCE AND TECHNOLOGY HAS SET A NEW STRATEGIC VISION AND PROVIDED POLICY GUIDELINES AND A MEASUREMENT FRAMEWORK WHICH WILL DIRECT AND EMPOWER THE EFFORTS OF THE CSIR, AS A MAJOR CONTRIBUTOR TO SCIENCE AND TECHNOLOGY IN SOUTH AFRICA IN THE YEARS AHEAD.

The past year, for the CSIR, has been one of excitement, challenge, contribution and ongoing change. We are proud of our progress and achievements, reviewed in this report, and mindful of those areas where we need to push harder.

We have pleasure in submitting to Parliament, through the Minister of Trade and Industry, as the minister responsible for the CSIR, this annual report on the activities of the CSIR for the financial year ended 31 March 1997.

NATURE OF OUR BUSINESS

The CSIR provides technology solutions and information through, *inter alia*, contract research and development and specialist consulting services to its clients and stakeholders in the public and private sectors.

ACTS AND LEGISLATION

As a statutory research council established by Government and governed by the Scientific Research Council Act (Act 46 of 1988), the CSIR was listed as a Public Entity by the Reporting by Public Entities Act in 1992. The objectives of the CSIR are spelled out in this Act, which determines that "in the national interest, the CSIR, through directed and multi-disciplinary research and technological innovation, should foster industrial and scientific development, either by itself, or in partnership with public and private sector institutions, to contribute to the improvement of the quality of life of the people of South Africa".

This annual report and its annual financial statements deal with all matters required by Schedule 4 of the Companies Act and the Reporting by Public Entities Act (Act 93 of 1992), where appropriate.

NATIONAL PRIORITIES FOR THE SCIENCE AND TECHNOLOGY COMMUNITY

- PROMOTING COMPETITIVENESS AND EMPLOYMENT CREATION
- ENHANCING QUALITY OF LIFE
- DEVELOPING HUMAN RESOURCES
- WORKING TOWARDS ENVIRONMENTAL SUSTAINABILITY
- PROMOTING AN INFORMATION SOCIETY

White Paper on S&T (section 2.1 p7)

Masking of a gas turbine combustion chamber before applying a plasma sprayed ceramic coating.

STRATEGIC CONTEXT

The CSIR's mandate must be contextualised within an environment of rapid and ongoing change resulting from national and global forces. South Africa is facing increased competitive pressures with its markets opening to the world. As a national asset, devoted to research and technological innovation, the CSIR's role is integral to the country's growth, development and transformation imperatives, and its continued interaction with the global environment.

The last few years have been devoted to the ongoing repositioning of the CSIR as an outward focused contract research organisation truly responsive to the needs of its clients and stakeholders. The past year has seen the emergence of important new elements in the strategic environment of the CSIR, in the form of the White Paper on Science and Technology ("Preparing for the 21st century"), and in the impending major review of the Science Councils (incorporating the Atomic Energy Corporation), a process which the CSIR wholeheartedly supports. The priorities reflected in the national policy for science and technology clearly provide the macro-strategic framework for the CSIR's endeavours. The organisation has, over the past year, had significant involvement in each of these national priority areas, which also represent the CSIR's strategic focus areas, as reported in *Technology Impact*, the companion document to this annual report.

IN ITS BUSINESS DEALINGS, THE CSIR OPERATES:

- AS A TECHNOLOGY PARTNER AND AN HONEST BROKER, WITH A GLOBAL PERSPECTIVE
- BY FOCUS AND INTEGRATION, APPLYING THE CLIENT-CONTRACTOR PRINCIPLE AND INVESTING TO BUILD COMPETENCE AND CAPACITY AND TO DEVELOP INNOVATIVE PRODUCT/SERVICE OFFERINGS
- THROUGH TECHNOLOGY ACQUISITION AND TRANSFER, TEAM WORK AND NETWORKING, AND ONGOING INDIVIDUAL AND ORGANISATIONAL LEARNING

CSIR STRATEGY

Through its vision, the CSIR seeks unambiguously to make a real and enduring difference in people's lives. As a premier contract science and technology organisation, its mission is to leverage the national effort in achieving sustainable development and economic growth through the provision of technology solutions and information. The CSIR's vision and mission statements reflect the interconnected duality of its challenge in developing and applying scientific and technological competences designed to support sustainable development and economic growth in South Africa.

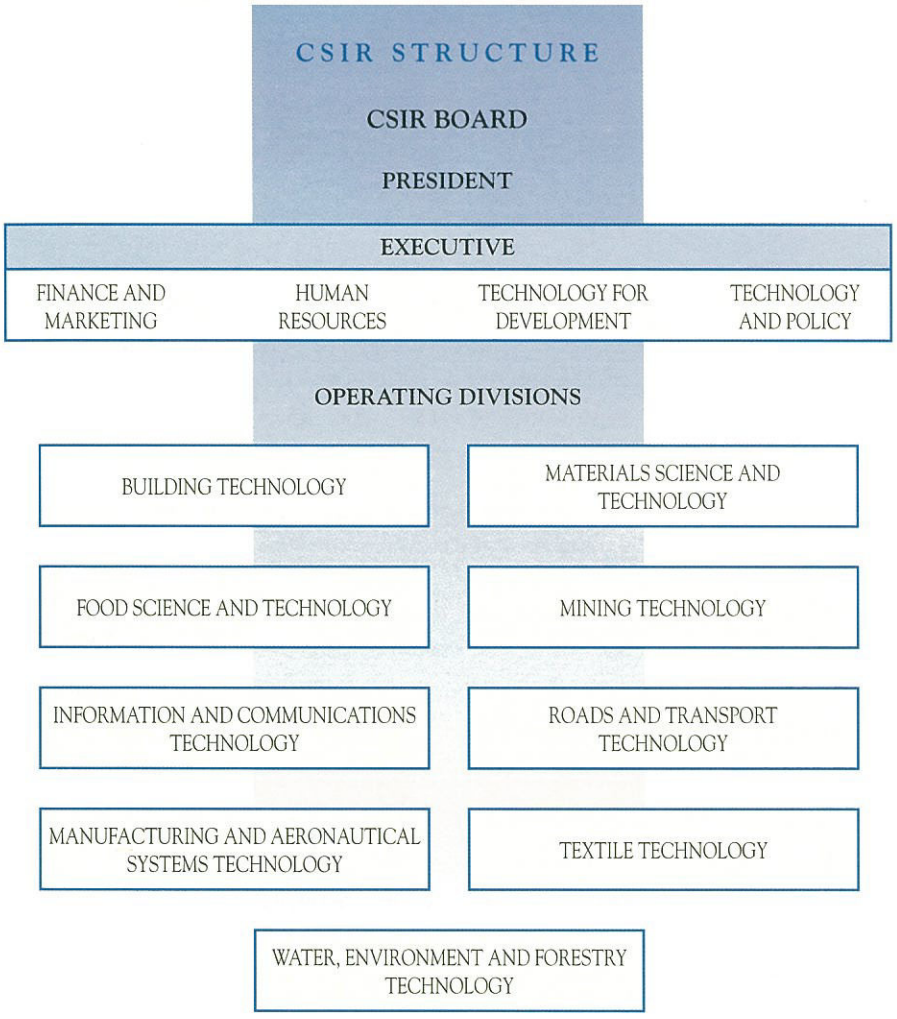
The CSIR's wide range of clients and external stakeholders include: commercial enterprise, small, medium and large, both formal and informal; the public sector at national, provincial and local levels; public enterprises and institutions; the national safety and security establishment; development structures such as NGOs; national and international funding agencies; urban and rural communities; labour; and international companies and organisations.

The local and international environment in which the CSIR operates is very fluid. This requires ongoing strategic review in relation to emerging opportunities and challenges, to refine the strategy in a dynamic way, in order to test relevance continually and to ensure the CSIR's continued contribution to the attainment of national objectives.

The CSIR's prevailing strategic framework, published in November 1993, has underpinned the first phase of its transformation in the context of the new South Africa. It is appropriate to generate a new strategy in the light of the profound current and anticipated changes, globally and locally, as the 21st century draws near. Against this backdrop, and within the framework of strategic management practice that has developed in the CSIR over the past decade, a new set of 10-year scenarios and a 3 to 5-year strategic plan are currently being formulated for submission to the CSIR Board. These new perspectives will undoubtedly inform the previously mentioned Science Councils' Review, and vice versa.

"In the national interest, the CSIR, through directed and multi-disciplinary research and technological innovation, should foster industrial and scientific development, either by itself, or in partnership with public and private sector institutions, to contribute to the

improvement of the quality of life of the people of South Africa."



ORGANISATION STRUCTURE

CSIR Board

The CSIR's Board, appointed for a term of three years by the minister responsible for administering the Scientific Research Council Act of 1988 (the Minister of Trade and Industry), approves the mission, goals, operating policies and priorities for the organisation. The term of the current Board came into effect on 1 October 1995 and extends until the end of September 1998. The Board met four times during the 1996/97 financial year, namely on 12 June, 27 August, 19 November 1996 and 28 February 1997.

CSIR Board members for the 1996/97 financial year were Drs Bill Venter (Chairman), Dhiro Gihwala and Ivy Matsepe-Casaburri, Profs Anton Eberhard, Friedel Sellschop and Errol Tyobeka, Ms Lyndall Shope-Mafole and Messrs Les Boyd, Khomotso Phihlela and Eugéne van As.

During the financial year being reported on, two Board members left the board. Prof Tyobeka resigned in August 1996 when he was appointed as Chief Director: Science Planning at the Department of Arts, Culture, Science and Technology, and Dr Matsepe-Casaburri resigned in January 1997 when she became Premier of the Free State Province. Neither of these Board vacancies had been filled at the end of the 1996/97 financial year. The current number of Board members is in excess of the statutory minimum.

EXECUTIVE REPORT *(CONTINUED)*

Executive Management

Executive responsibility for the CSIR rests with its executive management, that for 1996/97 consists of Dr Geoff Garrett as president and four executive vice-presidents: Albert Jordaan, Finance and Marketing; Dr Namane Magau, Human Resources (who joined the organisation in November 1996); Neo Moikangoa, Technology for Development; and Dr Adi Paterson, Technology and Policy. During the year under review, Dr Paterson took responsibility for the Human Resources portfolio, in an acting capacity, up to the time of Dr Magau's appointment. Mr Mike Groch, responsible for the commercial and small, medium and micro-enterprise executive portfolio, resigned at the end of April 1996.

Management Board

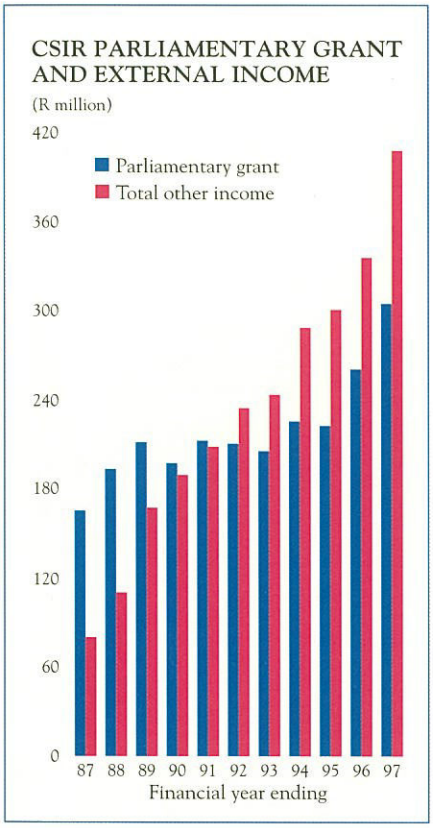
The CSIR's Management Board consists of the executive management and the division directors. For the 1996/97 financial year the division directors were Drs Neville Comins, Ben Fouché, Johann Fritz, Hoffmann Maree and Petro Terblanche and Messrs Johan Ahlers, David Bath, Jan Becker and Anthos Yannakou. Dr Fritz resigned as Director of the Division of Mining Technology in July 1996 and Dr Güner Gürtunca was appointed director in October 1996, having operated in an acting capacity prior to his appointment. Mr Mohamed Madhi joined the CSIR as Director of the Division of Communications and Information Networking Technology (renamed the Division of Information and Communications Technology in April 1997) in November 1996 and Mr Bath moved from the Division of Building Technology to take responsibility for the corporate business development portfolio. Mr Gaby Magomola joined the CSIR as Director of Building Technology in March 1997.

The chief accounting officer of the CSIR is the president, whose address is given on the inside front cover of this report.

Audit Committee

An audit committee formed in 1990 is integral to the CSIR Board's system of control. The committee meets twice during the financial year to deal with matters prescribed by the Act. These meetings took place on 5 June 1996 and 27 November 1996. The members of the audit committee are appointed annually. For the 1996/97 financial year the following members were re-appointed: Mr Eugéne van As (Chairman), Mr Les Boyd, Mr Khomotso Phihlela, Dr Dhiro Gihwala and Dr Geoff Garrett (ex officio).

The CSIR's vision and mission statements reflect the interconnected duality of its challenge in developing and applying scientific and technological competences designed to support sustainable development and economic growth in South Africa.



Human Resources Committee

The CSIR Board's influence and control of human resources is primarily exercised through the annually appointed human resources committee. The committee meets at least twice during the year to discuss and determine human resources policy and strategy.

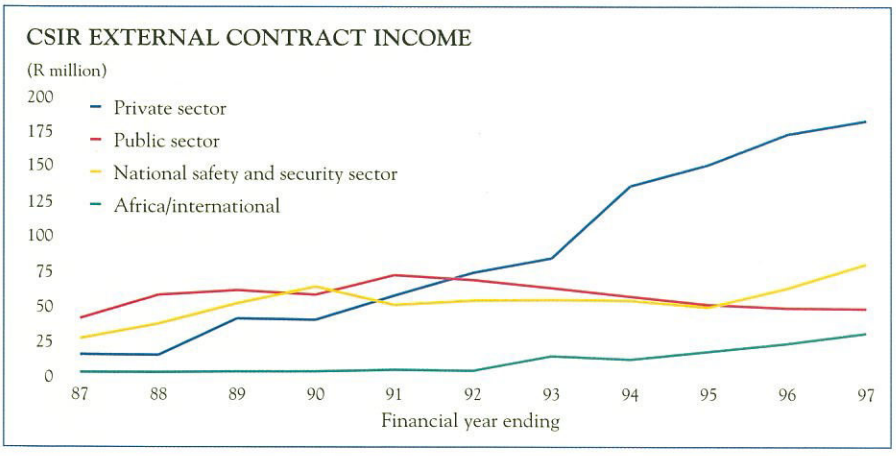
The members of this committee as at 31 March 1997 were: Dr Bill Venter (Chairman), Ms Lyndall Shope-Mafole, Prof Anton Eberhard and Dr Geoff Garrett (ex officio). Mr Khomotso Phihlela has subsequently been elected by the board as a replacement for Dr Ivy Matsepe-Casaburri.

ORGANISATION CHANGES

During the year under review, the CSIR consisted of ten operating divisions and two cross-cutting corporate programmes in the areas of Technology for Development and Industrialisation Support.

Respectively, these corporate programmes help source and integrate skills and expertise from across the organisation to respond to client and stakeholder needs.

The CSIR's on-line services from the Division of Information Services were commercialised to M-Net, as a result of the realignment of the CSIR's existing and future competences in information and communication technology. These services included Worldnet Africa content and connectivity services as well as Compuserve and represented the first major transfer of Internet-based technologies to the private sector, congruent with the CSIR's technology partnership role in industry and development markets.



EXECUTIVE REPORT *(CONTINUED)*

Correspondingly, two programmes from the Division of Information Services merged with the Division of Communications and Information Networking Technology on 1 April 1997, while certain functions previously located in the division, namely Computing Services and the Central Library Service, were retained as support services to the whole organisation, each under the auspices of a management committee chaired by a member of the CSIR's Management Board.

FINANCIAL PERFORMANCE

In response to the challenge, faced by all science councils, of undertaking increasingly more contract research and development work for the private and public sectors, the CSIR has steadily increased its external income over the past ten years. For the past financial year, a turnover of R641 million (1995/96: R563 million) representing a growth of 13,9% (1995/96: 13,1%), was achieved. It is important to note that, on a *per capita* basis, the turnover grew from R176 000 in 1995/96 to R209 000 per employee, or 18,8%, for the financial year reported on.

An external contract income target of R337 million was set and R334 million was realised (1995/96: R300,2 million). This represents nominal growth of 11% and real growth of approximately 3%. Again, the *per capita* external income grew from R94 000 to R109 000, or 16%. A net margin surplus of R33,4 million (5,5%) was set and a surplus of R68,7 million (10,7%) was achieved (1995/96: R43,4 million or 7,7%). Return on assets improved from 7,7% achieved in 1995/96 to 10,4% for the 1996/97 financial year. This year's return on assets is calculated in cognisance of the change in the accounting policy, without which it would amount to 14,6%, further supporting the fact that the higher turnover was achieved at improved efficiency levels.

CSIR Subsidiaries

The principal activities of the CSIR's two operating subsidiaries, the South African Inventions Development Corporation (SAIDCOR) and the Technology Finance Corporation (Technifin) are, respectively, the investment in and development of research, the implementation of technology and the acquisition and transfer of technology to industry by licensing new inventions, and the provision of finance to develop technology and venture capital for the exploitation thereof.

The CSIR's interest in its subsidiaries is dealt with in note 5 of the notes to the annual financial statements on page 46 of this report. The aggregate amount of profit of the subsidiaries amounts to R4 million.

In response to the challenge, faced by all science councils, of undertaking increasingly more contract research and development work for the private and public sectors, the CSIR has steadily increased its external income over the past ten years.

The CSIR's mine rope testing facility at Cottesloe, Johannesburg.

Post Balance Sheet Events

No material facts or circumstances have arisen between the dates of the balance sheet and this report which affect the financial position of the organisation as reflected in these financial statements.

TECHNOLOGY MANAGEMENT AND PARLIAMENTARY GRANT INVESTMENT

The CSIR places great value on the parliamentary grant and utilises these funds to address South Africa's needs by providing innovation in the form of products, services and information in areas where the nation has not adequately established competences. All the CSIR's investment activities related to the parliamentary grant, which amounted to R304 million for the 1996/97 financial year (1995/96: R260 million) are mediated through the CSIR's core management systems and full recording at a detailed level is ensured for all projects. The same disciplines that apply to external contracting apply to parliamentary grant funded projects.

During the past year the linking of investment planning to national goals and objectives have been strengthened using a sophisticated portfolio management approach. Science and, more particularly, technology are crucial instruments of leverage for South Africa to become economically competitive on a global scale on the one hand and, on the other hand, to provide essential services and infrastructure to help meet basic needs for all South Africans. The CSIR's portfolio approach seeks to maximise the impact of the resources available from Government for capacity building.

The CSIR has over the past two years developed and evolved a software investment process tool (IPT) from experience gained in investment management. It is utilised in a portfolio-based approach to monitor the status of investment of the parliamentary grant through the use of technology balance sheets. Investment decisions are therefore strongly integrated with divisional business planning. This avoids a fragmented project portfolio.

All these initiatives have been aimed at ensuring the technological competence of the organisation with which to serve client needs by providing high quality product and service offerings. The objectives for the next year are to concentrate on better technology foresight and scenario development by sharing current best practice more widely across the organisation.

Investment resources were also earmarked for integrated activities across divisions. A review of the impact of this approach to portfolio extension is currently under way and early indications suggest that very important new capacities and offerings have been developed. This approach has the merit of increasing the flexibility and partnering abilities of the CSIR in times when client and stakeholder needs are changing rapidly and consortium-based approaches to technology development are increasingly important to enhancing innovation and rate of delivery.

Impact Assessment

The effective utilisation of the parliamentary grant by the CSIR can be measured directly by assessing the extent to which the South African market (public and private sectors) is willing to make use of the CSIR's science and technology offerings. The level of income, therefore, that the CSIR generates through offerings which were developed using the parliamentary grant (attributable income) indicates the extent of uptake and relevance of the CSIR's services. A trend analysis of the ratio between this attributable income to exploited parliamentary grant for the period 89/90 to 96/97 shows a clear trend of increased effectiveness. The cumulative improvement represents both the resilience of the research base created and the organisational learning that occurred over this period.

BUSINESS GOALS

The CSIR has set strategic priorities which are, on an annual basis, reduced and translated into measurable goals. Progress against longer term priorities is measured, firstly, by determining short term measurements against the goals and, secondly, by determining performance against these short term goals.

Science and, more particularly, technology are crucial instruments of leverage for South Africa to become economically competitive on a global scale on the one hand and, on the other hand, to provide essential services and infrastructure to help meet basic needs for all South Africans.

As part of a contract with the South African maize board, the cereal team at Foodtek is introducing a broad-spectrum anti-fungal gene into South African maize, in collaboration with the Agricultural Research Council.

In summary these are:

- *growth* – growing the CSIR's business, in real terms, through meeting the needs of all clients, customers and stakeholders;
- *quality* – embedding quality and excellence in everything the organisation does through a focused Total Quality Management (TQM) initiative;
- *people* – ensuring that all staff feel increasingly positive, in a stimulating, innovative and rewarding working environment, and striving for employment equity across the organisation;
- *technology for development* – making a significant impact, through technology, on sustainable development in South Africa; and
- *information* – harnessing the power of the information revolution, both in the way the CSIR does business and the way it leverages its customers' business.

Growth

This goal has been to develop organisation-wide strategies to enhance the business performance of the CSIR around a major growth initiative. The CSIR is a major provider of technology solutions and information that earns close to 60% of its turnover from non-parliamentary grant sources. This means that over 1 700 jobs at the CSIR are funded by external income sources. The growth in contract income achieved by the CSIR since 1988 has created close to 1 100 jobs in the organisation (over a third of the CSIR's total staff complement). Of these, more than 550 jobs are filled by qualified graduates and diplomates.

EXECUTIVE REPORT *(CONTINUED)*

The challenge, therefore, has been – and remains – for each of the operating divisions to pursue an aggressive strategy of growth in relation to both existing and new markets. At the same time the CSIR's divisions must continue to work hard to develop new integrative initiatives to unlock new market opportunities outside the scope of current divisional operations.

As reported in the preceding section on financial performance on page 20 of this report, the effective implementation of these strategies has led to good performance against stretching financial targets.

Particularly noteworthy has been a 28% growth in income from the safety and security sector, to R78 million (1995/96: R61 million); this has been achieved despite some significant cuts in the nation's defence budget, reflecting an ongoing move towards supporting an increasingly technologically sophisticated defence and security sector.

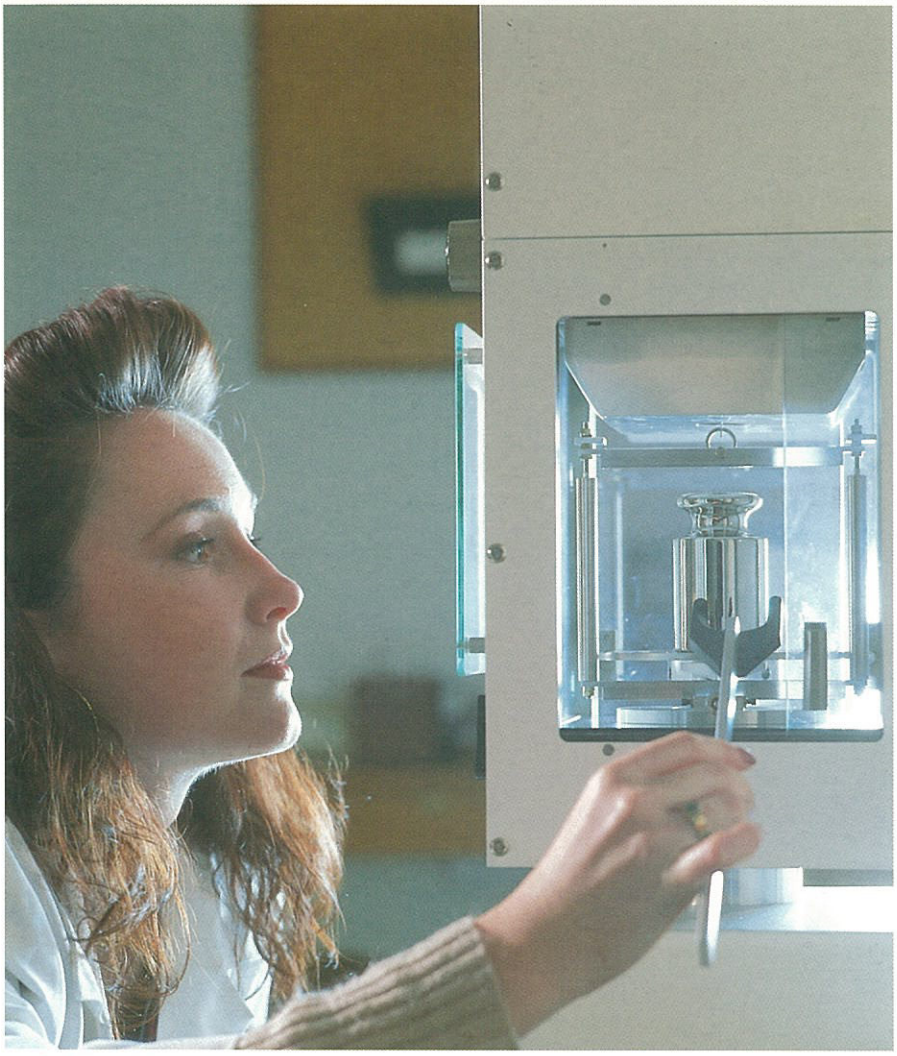
In the international arena also, sales have increased markedly, by 35% to R28,8 million (1995/96: R21,3 million), and continue to reflect the contribution the organisation can make as a technology provider in the broader global competitive environment.

One outstanding example of locally-developed technology that has found an international niche market is the Heavy Vehicle Simulator, originally developed by the CSIR's Division of Roads and Transport Technology. In 1996 two of these machines, manufactured under licence, were exported to the USA and Finland (to be shared by Sweden).

In the regional context, one of the CSIR's largest divisions, the Division of Water, Environment and Forestry Technology, in its first year of operation following the restructuring of three divisions during the previous financial year, generated close to 10% of its income outside South Africa, mainly in SADC countries, where it has been involved in marine work in Namibia, water quality projects in Botswana and Lesotho (related to the Lesotho Highlands Water Scheme), environmental impact assessments in Mozambique, as well as terrestrial and spatial technology projects in a number of African states.

Sustainable real growth in the CSIR's external contract income, at acceptable levels of profitability, continues therefore to be a critical requirement for the remainder of the millennium and beyond. Similarly, maintaining an appropriate level of parliamentary grant for investment in capacity and competence development will be essential. Without these two interconnected strands of enhanced revenue generation, the potential impact of deploying technology solutions and information will be eroded.

As a national asset, devoted to research and technological innovation, the CSIR's role is integral to the country's growth, development and transformation imperatives, and its continued interaction with the global environment.



Loading a weight on a comparator to measure a kilogram.

Creating a quality organisation

The CSIR's quality quest, commenced in earnest three years ago, remains essential to the management and effectiveness of the organisation's performance. Feedback from client satisfaction surveys (results reported on page 26 of this document) reflect the importance of continued effort by the CSIR to deliver on its commitments, on brief, on budget and on time – every time.

Greater coherence in quality planning across divisions and functional support units, as well as alignment of the CSIR's response to the quest for business excellence, was achieved in a cost-of-quality measurement exercise which underpins current improvement projects. An example in this regard is the identification in 1996 by one of the CSIR's smallest divisions, the Division of Food Science and Technology, of 138 quality improvement projects – equivalent to one per employee – of which 99 have been completed, documented and are in the implementation phase. Tangible benefits such as increased quality of life, customer satisfaction and cost efficiency are already being experienced.

Initiatives such as these are the result of the first full year of operation of the CSIR Quality Council which consists of the executive management and the divisional directors. Quality training was ongoing throughout the 1996/97 financial year and 453 members of staff received training (1995/96: 702), reflecting an ongoing commitment to building on initial major training interventions.

In addition, two of the CSIR's line divisions piloted the use of the USA's Malcolm Baldridge Quality Award approach which comprises a comprehensive measurement of the core elements leading to business excellence. This represents a key process in helping identify priority

areas for focused attention; it also provides a valuable international benchmark of progress and performance in the quality arena. From this pilot programme the decision has been taken to assess all divisions, utilising this approach, in the 1997/98 financial year.

Work on the re-evaluation, planning and deployment of the CSIR's management model started in 1996. The rapid evolution of new technologies has afforded the CSIR an opportunity to take an entirely new view on organisational policy, procedures, processes and standards as well as on how ongoing organisational learning can be captured. The Baldridge assessment and management model development are being linked and integrated to provide an ongoing basis for organisational quality planning and deployment in the service of the CSIR's customers.

The CSIR is also assisting the SA Quality Institute in the development of a South African business excellence model based on the Baldridge and European quality models in a consortium comprised of leading South African organisations.

Stakeholder Satisfaction and Customer Perceptions

As mentioned, a key quantitative indicator of the CSIR's performance in the quality domain derives from the perceptions of its customers and stakeholders. These are monitored regularly to provide indications of organisational performance in relation to issues such as delivering services on brief, on budget and on time. A full benchmark study is conducted every second year and in the intervening year two tracking surveys are undertaken. In the 1995 Benchmark study the Customer Satisfaction Index stood at –8 (0 being equal to 100% satisfaction) and in the two tracker studies in May and November 1996 the index was at –8. The information gathered in these comprehensive and independent market surveys serves as an input to the divisions' planning processes at all levels of the organisation. The results are used to define appropriate customer service strategies and to monitor trends in the performance of the organisation as perceived by the market-place.

People

The CSIR takes very seriously the need to achieve a truly representative staff complement. This remains a challenge against the background of the existing skills gap in the market-place as well as in higher education in the country. Hence also the CSIR's drive to contribute to the national skills upliftment drive through its bursary scheme, internships and strategic alliances with relevant institutions.

Sustainable real growth in the CSIR's external contract income, at acceptable levels of profitability, continues to be a critical requirement for the remainder of the millennium and beyond.

To meet the urgent need for training in the geo-information arena, Mikomtek's Satellite Application Centre at Hartebeesthoek and the Aerospace Remote Sensing Development Group, France are developing courses in remote sensing and geographic information systems.

Transformation

The CSIR has over the last two years embarked on a process of transforming itself into an organisation that is both relevant to the emerging South African priorities and the global market. The organisation's approach to transformation includes the empowerment of the operating units and human resources capacity building, development and procurement (through its Human Resource 2001 strategy), which includes recruitment targets for operational units reflecting the diversity challenge, and processes to promote employee career development. The CSIR's transformation initiatives are therefore articulated as a strategic part of its ongoing organisational change and development process and its detailed human resource strategies are in line with the overarching organisational transformation initiatives. Through the application of an integrated human resource management strategy, key performance areas, for example, are not viewed in isolation but as part of the human resource and business management system.

Currently there are Divisional Transformation Action Groups active in all nine divisions. A Central Transformation Action Group, whose mandate it is to monitor and give advice where appropriate, has also been established.

An integral part of organisational development involves meeting the requirements of equity with regard to race and gender in staff composition. The composition of the CSIR's staff, in terms of this requirement, has changed positively over the past two years, although much work still remains to be done. In 1996 33% (1995/96: 29%) of the total staff was black, and the composition of staff consisted of 42% white males, 25% black males, 25% white females and 8% black females (1995/96 respectively: 45%, 24%, 26% and 5%). Black people and white females together still represent the majority of staff at 58% (1995/96: 53%).

EXECUTIVE REPORT *(CONTINUED)*

The CSIR's personnel complement at 31 March 1997 was 3 068 (1995/96: 3 199). This reduction can mainly be attributed to the commercialisation of the CSIR's on-line services to M-Net and the amalgamation of the Division of Information Services with the Division of Communications and Information Networking Technology (now called the Division of Information and Communications Technology), as referred to on page 20 of this report. The average personnel turnover for the 1996/97 financial year was 13,8% (1995/96: 10,2%), but this figure includes an unavoidable turnover of 7,4%, nearly half of which is attributable to the 110 retrenchments which occurred during the financial year reported upon. The avoidable turnover for 1996/97 was 6,4% (1995/96: 6,4%).

During the 1996/97 financial year, exceptional progress was made towards improving past imbalances in the CSIR's bursary programme, as 60% of the 116 CSIR bursars were black and 25% female (1995/96: 102 bursars of whom 48% were black and 26% female). Of the 55 new bursaries awarded in 1997, 82% went to black people and 23% to females.

Beyond the formal education sector the CSIR is involved in a significant number of capacity building initiatives with communities. In addition, its existing in-house adult basic education and training centre for the training and educating of CSIR staff supported 80 black staff members for training up to matric level in 1996.

In the last two years the CSIR started providing increased internship opportunities and in service training to technikon diploma and university degree students. The duration of the training ranges from six to eighteen months. Two years ago six students were involved in piloting this programme in one division. During the past financial year 46 students have benefited from this programme. In addition, a Technology Leadership Programme (TLP) was initiated to enhance employee skills in understanding and using technology innovatively in the context of social and economic needs. This programme has already accommodated eleven CSIR professionals, of whom five are black and six are female.

The CSIR's Advanced Leadership Programme (ALP) has been operating for two years and is focused on equipping the organisation with leaders for the future. The two ALP programmes in 1996 accommodated a total of 26 candidates – nine of whom were black and ten were female (1995: 11 candidates of whom three were black and five female).

During the 1996/97 financial year, an apprentice training centre was re-established at the Division of Manufacturing and Aeronautical Systems Technology, with a view to broadening the base of technical skills available to the SMME (small, medium and micros/enterprise) sector. The training centre will fill a gap that exists in the training arena, providing a means of career development for semi-skilled staff.

Responsiveness and performance orientation, that have become a passion for the organisation since the first wave of transformation, continues to dominate its agenda and creates a sound platform for further transformation and enhances confidence in the

CSIR's ability to rise to the challenges reflected in its strategy and organisational priorities.

The CSIR is supporting the development of a Cashmere Working Group, a partnership of research, tertiary education and agricultural institutions which is assessing the viability and long term development of a cashmere industry in the SADC region. Research on over 100 samples collected from both commercial and indigenous farming communities has been conducted.

Organisation Climate

A six monthly internal climate survey is conducted amongst all CSIR employees to reflect employee satisfaction levels in the organisation. During the 1996/97 financial year the surveys were done in June and November with employee satisfaction indices of 67% and 69% respectively, which is a marked improvement over the 1995/96 aggregate of 62%.

These surveys also constitute a major measurement instrument for assessing alignment of human resource management plans and processes with overall organisational goals and strategy. This system of measuring is a vital part of the organisational culture of ongoing change and provides the data required for developing human resource related improvement and growth strategies. Some of the significant trends for organisational development which were highlighted by these surveys over the past year were in areas of performance management and career development needs with a changing work culture, and employees' perceptions of organisational progress in the areas of employment equity and diversity in the work-force.

New Medical Aid Scheme

A note (note 15) to the CSIR's 1995/96 annual financial statements referred to an accumulated liability in respect of post-retirement medical benefits for employees for which the CSIR recognises its obligation. In order to minimise the impact of the escalating annual cost to operations and to limit the growth in this liability, the CSIR formed its own medical aid scheme with effect from 1 April 1997. Based on managed health care principles, with a strong emphasis on co-responsibility between employer and employee, the objective is to provide sustainable health care and simultaneously limit the cost, present and future, to a level which is affordable.

EXECUTIVE REPORT *(CONTINUED)*

The CSIR Board set aside a cash resource of R190 million, the proceeds of which will substantially cover the actuarial valuation of the liability of R280 million (as at 1 January 1997). Although an amount of approximately 4,7% of payroll would still be required over the next 20 years to fully fund the liability, this action serves to limit this escalating cost whilst providing a funding model to employees to co-fund for their medical costs at retirement. The new CSIR fund is administered by Visimed and governed by a board of trustees consisting of two members of the executive management, namely Mr Albert Jordaan and Dr Namane Magau and the CSIR's corporate financial manager, Mrs Suzette Harmse.

Labour Relations

Labour relations remain sound, with work place forums active in the nine divisions and a Board-approved employment equity policy underpinning transformation. The CSIR and NEHAWU are co-operating to provide targeted training and education, on the role and function of technology as part of industrial activity, to shop stewards and union representatives. This initiative is linked to (and anticipates) the role of work-place forums envisaged in the Labour Relations Act. It is likely that this will be an important area of investment for the CSIR for a number of years, and is congruent with improving the public understanding of science and technology. Reaction from the labour movement has been positive.

Specific actions were also taken to ensure employee representation in matters of mutual interest. The newly established forums have already, in the 1996/97 financial year, played a major role in this regard and will definitely become an asset in maintaining sound labour relations in the organisation.

Technology for Development

The CSIR's Technology for Development thrust, shaped by its commitment to contribute in a meaningful way to the national project of democratisation, achieved greater visibility and emphasis as it translated into a determination to transfer appropriate technology inputs, in support of the priorities of national, provincial and local growth and development strategies, focused on sustainable socio-economic development of historically disadvantaged communities.

In recent years the parliamentary grant investment has shifted significantly towards the creation of capacities, products, services and technologies aimed at the development arena and the SMME sector, in response to major national priorities.

Key elements in the development strategy are the support for SMMEs, meeting basic community needs and providing integrated decision-making support systems and other services. Closer links with the Small Business Centre, Ntsika Enterprise Promotion Agency (NEPA) and

The information challenge for the CSIR has two dimensions: leveraging internal effectiveness through appropriate application of information technologies and harnessing this power in both refined and new externally-directed product and service offerings.

Aid for Pretoria's strategic planning – Boutek is involved in setting up a Development Framework Information System for the Greater Pretoria Metropolitan Council to facilitate the planning, development and maintenance of an information system to support the Strategic Metropolitan Development Framework initiative of the GPMC.

other role players in the small enterprise sector are being developed. The CSIR is also a partner in the launch of two proposed pilot Manufacturing Advisory Centres (one in Port Elizabeth and one in KwaZulu-Natal). Quantitative measurement of ongoing performance and contributions in the development arena remains a challenge, and a priority to resolve.

CSIR activities have led to the creation of numerous new jobs in environmental, manufacturing and business fields as well as road maintenance programmes. The partnership with the Lubisi Dam Development Forum in the Eastern Cape is an example of a relationship in which the CSIR and local communities have engaged in capacity building in recent times.

Harnessing the Information Revolution

The information challenge for the CSIR has two dimensions: leveraging internal effectiveness through appropriate application of information technologies and harnessing this power in both refined and new externally directed product and service offerings.

In line with major ongoing changes, to align with the pace and challenges of the information revolution, and as previously mentioned, during 1996 the CSIR strategically repositioned its operational resource base to harness synergies and form a new, combined Division of Communications and Information Technology. During the year under review, the development of capabilities in network security and software development tools has positioned the CSIR to exploit opportunities in electronic commerce, business process re-engineering, human resource policy and processes, as well as investment strategy formulation.

OTHER KEY INITIATIVES

Policy Support

The CSIR contributed, through key staff, to a number of national policy processes of which the development of the White Paper on Science and Technology was the most important, since it provides policy guidelines and a measurement framework which will direct both the organisational and divisional efforts of the CSIR in the years ahead. It will influence the CSIR in terms of its leading contribution to the National System of Innovation. The strategic objectives of promoting competitiveness, enhancing quality of life, developing human resources, working towards environmental sustainability and promoting an information society are, for the first time, objectives to which science and technology institutions must direct their efforts. The CSIR also interacted with the parliamentary committees for Trade and Industry, and Arts, Culture, Science and Technology. It has supported a number of the strategic initiatives of the Department of Trade and Industry, most importantly the industrial cluster studies, development corridor strategies and SMME business initiatives.

Policy formulation support is increasingly important and the CSIR is well-positioned to give quality input to critical national government and provincial government initiatives. It has continued to build relationships with international policy formulation groups in order to increase the CSIR's visibility in the global science, technology and innovation environment. Information and communication technologies and their impact on society also represent a crucial area for policy development. The CSIR will therefore continue to play a strategically important role in this policy domain for the foreseeable future.

Environment, Health and Safety (EHS)

Unannounced and announced audits were conducted and counted 25% and 75% respectively towards the final audit percentage. The aggregate for individual ratings by divisions during 1996 was 86,1% (1995/96: 83,5%), while the aggregate for the unannounced EHS audit came to 85,9%. The trophy for best performance for the 1996 audits went to the Division of Materials Science and Technology and the trophy for Best Improvement to the Division of Food Science and Technology's Fishing Industries Research programme in the Cape. The CSIR retained its 4-star grading during the internal CSIR audit. This is an excellent achievement, considering that the system was amended to accommodate new legislation which made compliance with the EHS more difficult.

The White Paper on Science and Technology provides policy guidelines and a measurement framework which will direct the efforts of the CSIR in the years ahead, and influence its leading contribution to the National System of Innovation.

The mild steel tunnel for research into coal dust explosions at the CSIR's Kloppersbos explosion research facility near Pretoria which is part of Miningtek.

Alliancing and networking

CSIR staff collaborate widely, both locally and internationally, but establishing and promoting new relationships with institutions of tertiary education in South Africa was a key activity for CSIR staff in 1996/97, and will be again in 1997/98 and beyond. As an example, the CSIR has embarked upon a new programme of facility sharing with universities for post-graduate educational purposes as well as for better serving clients' needs. The funding pressures increasingly experienced by the tertiary education institutions, and their responding move more into contract research, will undoubtedly also stimulate the CSIR's competitive environment; equally, however, this will surely open the way for a new vision and approach to alliancing and networking in the spirit of building "Team South Africa".

In the international arena specifically, the CSIR is consciously building longer-term strategic alliances with international institutions and companies as well as responding to targeted international business opportunities capitalising on specific CSIR expertise and a favourable rand/dollar exchange rate.

Formal co-operation agreements in this regard include these with:

- Fraunhofer-Gesellschaft (FhG) and the Fraunhofer-Management (FhM) of Germany, through a major initiative dealing with the automotive component industry, and
- National Institute of Standards and Technology (NIST) of the United States of America, regarding the manufacturing industry in South Africa, co-operation in the field of metrology, and a special focus on medium-sized businesses.

CSIR SUPPORT TO NATIONAL HUMAN RESOURCE DEVELOPMENT INCLUDES:

- IN-SERVICE TRAINING
- TECHNOLOGY COMPETITION FOR SCHOLARS
- RESOURCING SCIENCE TEACHERS
- PARTNERSHIPS FOR CAPACITY BUILDING AT HISTORICALLY DISADVANTAGED INSTITUTIONS

Supporting national human resource development in science and technology

A special initiative by the Department of Arts, Culture, Science and Technology in supporting the requirements of the White Paper on Science and Technology has been instrumental in directing the efforts of the CSIR in support of the national priority of human resource development.

The CSIR presently funds 54 promising students at tertiary educational institutions, providing them with first-hand exposure to client projects, also reinforcing a partnering role with such institutions. In-service training at the CSIR currently accommodates 34 technikon diploma students (1995/96: the first 8 students participated in a pilot in-service training programme).

In the broader area of human resource development and enhancing awareness of the importance of science and technology, the CSIR over the last 24 months – at its Scientia site in Pretoria alone – has received over 7 000 scholars as visitors to the CSIR. It has been involved in the science and technology forum in the Western Cape, and piloted *Mindwalk* – a very successful technology competition as part of its outreach programme – to schools in Gauteng in 1996. This competition has been extended to three other provinces during the next year, and will be closely linked to the Year of Science and Technology in 1998. A further initiative which provides resources to science teachers has been launched in the Western Cape. The CSIR can support this national imperative through helping to initiate such human resource development projects which, once established, can be transferred to more appropriate role players.

The CSIR has also developed partnerships for capacity building at historically disadvantaged institutions. The most significant of these to date is the partnership with the University of the North, FRD, Silicon Graphics and MSI to create a Centre of Excellence in Computational Materials Science focused on indigenous technologies, food security and textiles.

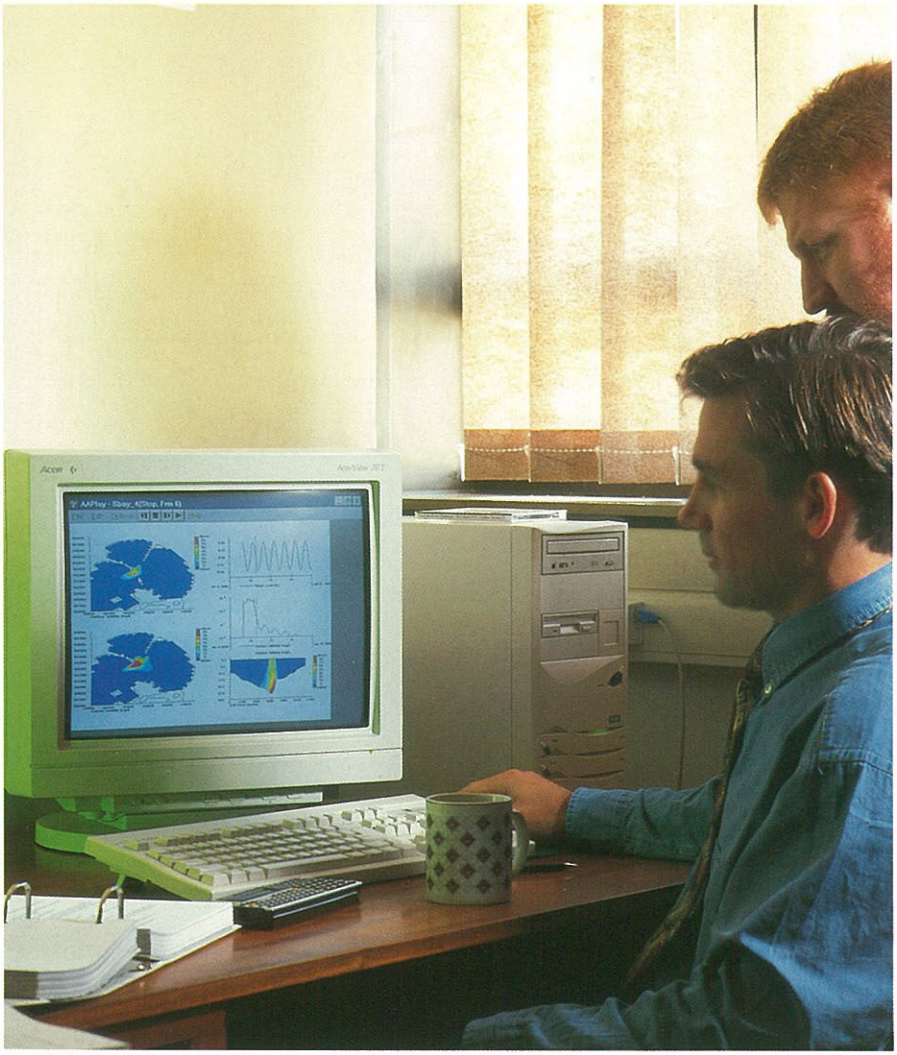
Support for manufacturing

The CSIR has achieved significant alignment over the past two years with industrial policy developments of the Department of Trade and Industry as part of its initiative to support the manufacturing sector.

During the last four years, the CSIR has strengthened its interactions with formal sector SMME's and has piloted various initiatives (usually in partnerships) to strengthen and support SMME creation, extension and leverage. This has included "funnel and bridge" activities such as the transfer and refurbishment of a complete relay manufacturing plant from Europe to South Africa. The majority of small contract activities of the CSIR are undertaken for small and medium enterprises and provide a critical input into the well-being and support of this sector.

By the turn of the century the CSIR will have been significantly transformed from a Gauteng-centred organisation with some activity in other provinces to an organisation represented in all nine provinces and a distribution of business far better reflecting

provincial GDPs.



The state-of-the-art DELFT3D numerical model has been applied by the CSIR to assess the impacts of proposed dredging operations on Saldanha Bay and Langebaan Lagoon.

The application of this modelling system forms part of a collaborative agreement with Delft Hydraulics of the Netherlands, the developers of the model. DELFT3D has wide applicability in the field of marine pollution, marine ecology and sediment transport.

Micro, small and medium enterprises are being targeted for support through the national partnership which has been formed between the Ntsika Enterprise Promotion Agency, the National Productivity Institute and the CSIR. The partnership has been operating since July 1996 and concentrates its efforts in SMME support such as manufacturing advisory centre, technology demonstration centre and innovation centre pilot activities. For the manufacturing advisory centre pilots, for instance, the CSIR will second technologists and provide information links to its manufacturing knowledge. Two of these pilots are at advanced stages of development, in Port Elizabeth and Durban.

The CSIR and Rapid Design Technologies (Pty) Ltd (RDT) have established a time compression technologies centre which consists of the CSIR's product development centre and its mould technology centre and the rapid-tooling and stereolithography know-how from RDT. The centre demonstrates the latest technologies in rapid product development and also transfers them to the South African manufacturing industry. In addition, *inter alia* it: plays a key training role; creates new job and career opportunities in the manufacturing industry; and provides a broad-based technology infrastructure to render commercial services over a large part of the product-development cycle.

Expansion into the provinces

In line with South Africa's national growth and development strategy, the CSIR is developing a more visible and market appropriate presence in all nine provinces to better meet the needs of its wide range of and geographically dispersed clients and stakeholders. Strategic policy and operational guidelines have been developed to ensure that provincial needs will become part of the core strategy and business of the CSIR. An action list of supporting tactics

EXECUTIVE REPORT *(CONTINUED)*

necessary to embed this new drive has been drawn up and Management Board members responsible for each province appointed.

Specific actions were primarily led by the CSIR's Divisions of Water, Environment and Forestry Technology (Environmentek) and Roads and Transport Technology (Transportek). For example, Environmentek reconstructed and strengthened its presence in the Western Cape, Mpumalanga and KwaZulu-Natal, where it is involved in environmental management programmes. In a major Eastern Cape contract funded by the European Union (EU) and the Department of Water Affairs and Forestry (DWAF), Environmentek is working with local and international consultants on water supply and sanitation projects.

The CSIR's Division of Food Science and Technology also contributed significantly to the growth of the CSIR's business in the Western Cape: the Fishing Industries Research programme (previously FIRI), which merged into the CSIR in 1995, grew its external income by 78% during the 1996/97 financial year, with most of the growth related to non-fishing contracts.

By the turn of the century the CSIR will have been significantly transformed from a Gauteng-centred organisation with some activity in other provinces to a new organisation represented in all nine provinces and a distribution of business far better reflecting provincial GDPs.

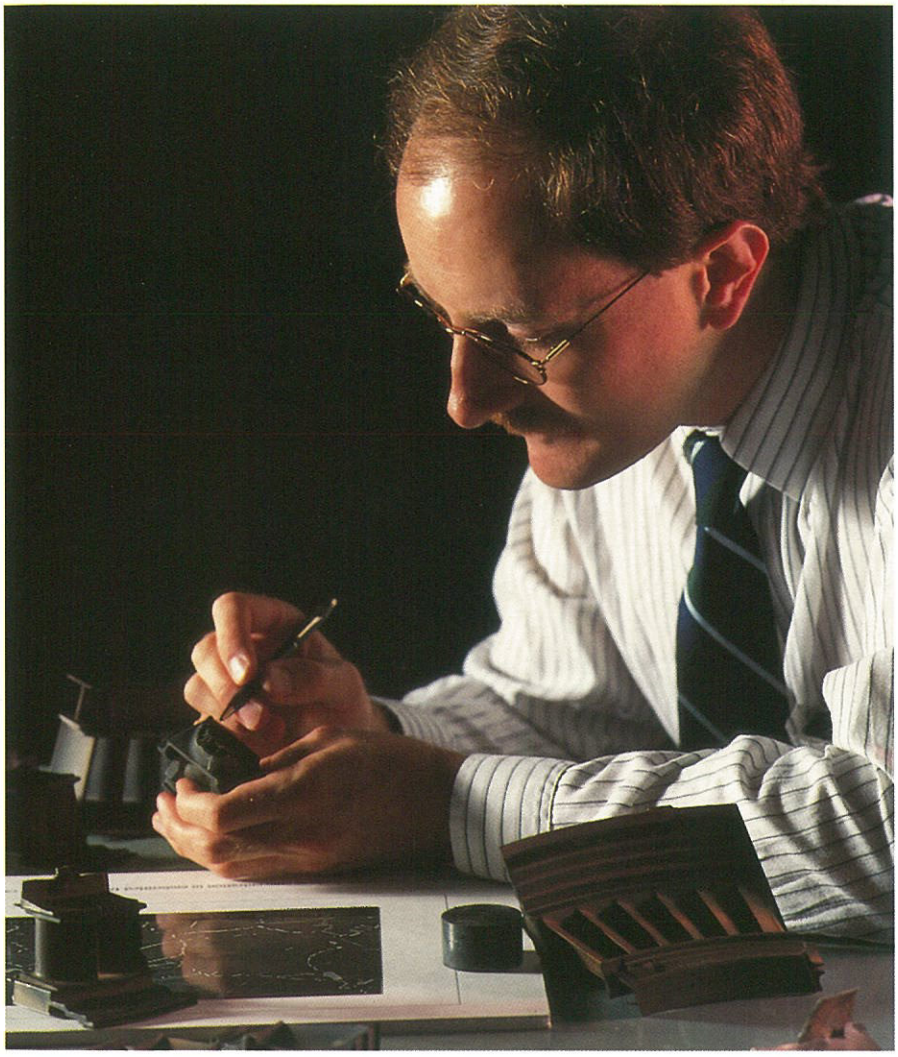
IN CONCLUSION

Responsiveness and performance orientation, that have become a passion for the organisation since the first wave of transformation, continued to dominate the agenda during the past year. This creates a sound platform for further transformation and enhances confidence in the CSIR's ability to rise to the challenges reflected in its strategy and organisational priorities.

Relevance and contribution to national priorities will, for the CSIR, depend on creative competitiveness. The CSIR must strive for the highest possible levels of scientific and technological excellence, and quality in all aspects of its business. It must continue to seek to command the highest respect, locally and internationally, and effectively manage the investment of its parliamentary grant in building relevant capacity of critical mass. It must develop and penetrate new local, regional and international markets and nurture a wide network of quality contacts, alliances and partnerships around the globe to complement and stimulate its activities. It must also conduct business in a manner that is above reproach and that ensures the organisation's continued financial health.

"Impacting the lives of all South Africans" will surely emerge as a rallying cry for many of the role players in the science and technology community at large and will be a significant signpost for their activities and contribution. In consequence, in helping to create a pervasive national culture of innovation, the CSIR must enhance its support of public awareness and

"Impacting the lives of all South Africans" will surely emerge as a rallying cry for many of the role players in the science and technology community at large and will be a significant signpost for their activities and contribution.



Investigating failure analysis of a gear and pinion.

understanding of science, engineering and technology initiatives. Ultimately, however, the organisation must be measured according to its making an increasingly meaningful contribution in providing technology solutions and information that really leverage sustainable development and economic growth for our nation.

We would, in closing, like to sincerely thank all those who have made 1996/97 the successful year that it has been: our board members, our management and staff and, most especially, all our clients and stakeholders.

BOARD APPROVAL

The annual financial statements of the CSIR for the year ended 31 March 1997, as set out on pages 13 to 52 of this report, have been approved by the CSIR's executive management and by the CSIR's Board at its meeting held on 11 June 1997. The Board is of the opinion that the CSIR is financially sound and operates as a going concern. The annual financial statements have been prepared in accordance with the relevant accounting policies based on generally accepted accounting practices and the requirements of the Reporting by Public Entities Act (Act 93 of 1992), insofar as it applies to the CSIR.

These statements are signed on behalf of the CSIR Board by:

Dr William P Venter
CSIR BOARD CHAIRMAN

Dr Geoff Garrett
CSIR PRESIDENT

INCOME STATEMENT

FOR THE YEAR ENDED 31 MARCH 1997

	Notes	GROUP 1997 R'000	GROUP 1996 R'000	CSIR 1997 R'000	CSIR 1996 R'000
Turnover	2	644 501	562 869	641 315	562 869
Other income		915	149	915	149
Profit on disposal of fixed assets		10 137	3 090	10 137	3 090
Total operating income		655 553	566 108	652 367	566 108
Expenditure					
Employees' remuneration		325 148	291 282	325 148	291 282
Depreciation	6	26 353	23 888	26 313	23 888
Operating expenses		295 205	246 786	290 761	242 438
Total expenditure		646 706	561 956	642 222	557 608
Net operating surplus for the year before investment income	4	8 847	4 152	10 145	8 500
Income from investments	7	35 450	34 898	58 526	34 885
Net surplus for the year		44 297	39 050	68 671	43 385
Transfer to self-insurance fund		3 000	—	3 000	—
Accumulated funds at the beginning of the year		470 711	431 661	460 574	417 189
Changes in accounting policy	3	190 000	—	190 000	—
Accumulated funds at the end of the year		322 008	470 711	336 245	460 574

BALANCE SHEET

31 MARCH 1997

	Notes	GROUP 1997 R'000	GROUP 1996 R'000	CSIR 1997 R'000	CSIR 1996 R'000
CAPITAL EMPLOYED					
Total accumulated funds		332 008	477 711	346 245	467 574
Accumulated funds		322 008	470 711	336 245	460 574
Self-insurance fund		10 000	7 000	10 000	7 000
Long-term liability	13	7 113	7 466	—	—
Total capital employed		339 121	485 177	346 245	467 574
EMPLOYMENT OF CAPITAL					
Fixed assets	6	225 513	198 160	225 372	198 004
Investments	8	36 594	36 968	35 000	35 000
Interest in subsidiaries and associate companies	5	—	1 005	27 220	27 220
Net current assets		77 014	249 044	58 653	207 350
Current assets		186 207	355 025	181 202	306 703
Debtors and advances	9	109 639	93 877	108 864	93 439
Stock and contracts in progress	10	27 678	22 972	27 580	22 937
Cash and short-term deposits		48 890	238 176	44 758	190 327
Current liabilities		109 193	105 981	122 549	99 353
Advances received	11	5 021	5 732	4 813	5 414
Short-term loan	14	—	—	14 932	—
Creditors and provisions	12	104 172	100 249	102 804	93 939
Total employment of capital		339 121	485 177	346 245	467 574

CASH FLOW STATEMENT

FOR THE YEAR ENDED 31 MARCH 1997

	Notes	GROUP 1997 R'000	GROUP 1996 R'000	CSIR 1997 R'000	CSIR 1996 R'000
Cash generated from operating activities		**9 385**	3 479	**14 517**	1 916
Cash generated by operations	A	**26 641**	25 202	**26 321**	29 298
Cash utilised by changes in working capital	B	**(17 256)**	(21 723)	**(11 804)**	(27 382)
Cash (utilised)/generated from investment activities		**(8 318)**	1 299	**14 982**	4 415
Income from investments (note 7)		**35 450**	34 898	**58 526**	34 885
Fixed assets acquired	C	**(58 832)**	(36 007)	**(58 807)**	(35 851)
Proceeds on disposal of fixed assets	D	**15 263**	5 381	**15 263**	5 381
Investments acquired		**(199)**	(1 968)	**—**	—
Subsidiary acquired		**—**	(1 005)	**—**	—
Cash generated		**1 067**	4 778	**29 499**	6 331
Increase in short-term loan		**—**	—	**14 932**	—
(Decrease)/increase in long-term liabilities		**(353)**	7 466	**—**	—
Decrease/(increase) in cash and cash equivalents		**189 286**	(12 244)	**145 569**	(6 331)
Transfer to medical aid scheme		**(190 000)**	—	**(190 000)**	—
Cash utilised		**(1 067)**	(4 778)	**(29 499)**	(6 331)

NOTES TO THE CASH FLOW STATEMENT

FOR THE YEAR ENDED 31 MARCH 1997

	GROUP		CSIR	
	1997 R'000	1996 R'000	1997 R'000	1996 R'000
A. Cash generated by operations				
Net operating surplus before investment income	8 847	4 152	10 145	8 500
Adjusted for:				
Depreciation	26 353	23 888	26 313	23 888
Profit on disposal of fixed assets	(10 137)	(3 090)	(10 137)	(3 090)
Adjustment relating to associated company now consolidated	—	252	—	—
Write off of investments in subsidiary	505	—	—	—
Loan write off in subsidiary	500	—	—	—
Technology advances written off	276	—	—	—
Amortisation of technology licensing	297	—	—	—
	26 641	25 202	26 321	29 298
B. Cash utilised by changes in working capital				
Debtors and advances	(15 762)	(21 347)	(15 425)	(20 911)
Stock and contracts in progress	(4 706)	25 200	(4 643)	25 235
Advances received	(711)	(31 527)	(601)	(31 356)
Creditors and provisions	3 923	5 951	8 865	(350)
	(17 256)	(21 723)	(11 804)	(27 382)
C. Fixed assets acquired				
Land and buildings	12 312	4 079	12 312	4 079
Equipment	46 024	31 244	45 999	31 088
Vehicles	496	684	496	684
	58 832	36 007	58 807	35 851
D. Proceeds on disposal of fixed assets				
Book value of assets disposed of	5 126	2 291	5 126	2 291
Cost	27 775	21 941	27 771	21 941
Accumulated depreciation	22 649	19 650	22 645	19 650
Profit on disposal	10 137	3 090	10 137	3 090
	15 263	5 381	15 263	5 381

1. Principal accounting policies

The annual financial statements are prepared on the historical cost basis, in accordance with generally accepted accounting practice and incorporate the following principal accounting policies, which have been consistently applied in all material respects.

1.1 Basis of consolidation

The annual consolidated financial statements incorporate the annual financial statements of the CSIR and its subsidiaries. The operating results of the subsidiaries are included from the effective dates of acquisition and up to the effective dates of disposal. All significant inter-company transactions and balances have been eliminated.

Premiums arising on the acquisition of subsidiaries are written off on acquisition and is only recognised as an asset if future income is anticipated. In this situation, the goodwill is amortised to income on a systematic basis over its useful life.

1.2 Associate companies

Associate companies are those companies in which the group has a significant influence and which it intends to hold as long-term investments. Associate companies are accounted for by the equity method from their most recently audited financial statements or unaudited management information as at 31 March 1997.

1.3 Research and development

Research costs are charged against income as and when incurred. Development costs of clearly defined products, of which the future technical feasibility and commercial viability has been proven to the satisfaction of the Board, are capitalised (refer note 1.5.3). The extent of capitalisation is limited to an amount equal to the present value of expected net future income.

1.4 Foreign currencies

Assets and liabilities in foreign currencies are converted to South African Rand at the rate of exchange ruling at the year-end date or rates stipulated in forward exchange contracts. Conversion differences are dealt with in the income statement. Transactions during the year are converted to the South African Rand at the rate of exchange ruling at date of payment, unless forward exchange contracts have been secured. Forward exchange contracts are secured for all material foreign liabilities.

1.5 Fixed assets and depreciation

1.5.1 *Land and buildings*

Land and buildings are stated at cost. Buildings are regarded as investment properties and are not depreciated. Provision for maintenance is charged against income.

1.5.2 *Plant, equipment and vehicles*

Plant, equipment and vehicles are stated at cost less accumulated depreciation.

1.5.3 *Development expenditure and intellectual property*

Development expenditure and intellectual property consist of capitalised development costs as approved by the Board. Capitalisation is limited to the present value of expected net future income (refer note 1.3).

1.5.4 *Depreciation*

Depreciation is based on cost and calculated on the straight line method at rates considered appropriate to write off book values over the estimated useful lives of the assets except for:

- Assets costing R2 000 or less, which are written off in the year of acquisition.
- Assets specifically acquired for a contract, which are depreciated over the life of the contract.
- Strategic assets of limited commercial application, which are written down to expected future commercial recoverable value at acquisition, with the remaining book value depreciated over the estimated useful lives of the assets.
- Development expenditure and intellectual property, which are depreciated over a maximum period of three years.

The estimated lives of the main categories of fixed assets are as follows:

Plant	– 10 years
Equipment	– 5-10 years
Computer equipment	– 3-7 years
Vehicles	– 5 years
Development expenditure and intellectual property	– 3 years

1.6 **Investments**

Investments are stated at cost less amounts written off. Investments are written down where, in the opinion of the Board, a permanent diminution in value has occurred.

1.7 **Post-retirement benefits other than pensions**

The excepted costs of medical aid contributions in respect of employees in service on or before 30 September 1996 are charged to income in order to spread the cost over the service life of employees entitled to those benefits. Cost are assessed in accordance with the advice of qualified actuaries. An actuarial valuation is performed at intervals of no more than three years.

Adjustments based on an actuarial valuation and prior service costs resulting from plan amendments are charged to income in the year they occur.

1.8 **Turover**

Turnover comprises:

- The net invoiced value of research, development and implementation contracts excluding value added tax.
- Income acknowledged on contracts in progress as calculated per note 1.9
- The annual parliamentary grant
- Royalties
- Consolidated turnover excludes sales to Group companies.

1.9 **Stock and contracts in progress**

Raw materials and finished goods are stated at the lower of cost and net realisable value. Cost of stock is determined by the average method. Contracts in progress are stated at the lower of cost and net realisable value. Net realisable value is calculated as a percentage of the sales value of work completed, after provision for losses relating to the stage of completion and any foreseeable losses to completion of the contract.

1.10 **Comparative figures**

Where necessary comparative figures have been re-stated to ensure comparability.

	GROUP				CSIR			
	1997 R'000	%	1996 R'000	%	1997 R'000	%	1996 R'000	%
2. Turnover								
Parliamentary grant	304 030	47	260 128	46	304 030	47	260 128	46
Contract income	337 399	52	300 285	53	334 213	52	300 285	53
Private sector	183 787	29	170 888	30	180 601	28	170 888	30
Public sector	46 567	7	47 073	8	46 567	7	47 073	8
National Safety and Security sector	78 247	12	60 952	11	78 247	12	60 952	11
Other sectors (including Africa)	28 798	4	21 372	4	28 798	5	21 372	4
Royalties	3 072	1	2 456	1	3 072	1	2 456	1
Total turnover	644 501	100	562 869	100	641 315	100	562 869	100

	GROUP		CSIR	
	1997 R'000	1996 R'000	1997 R'000	1996 R'000
3. Changes in accounting policy				
Post-retirement medical aid	190 000	—	190 000	—
During the year the CSIR changed its accounting policy for post-retirement medical benefits in order to recognise future obligations. In the past the CSIR did not make provision for the future liability arising from its obligation to provide for the cost of medical benefits to retired employees. (Refer note 15)				
Results for the current year and accumulated funds at the beginning of the year have not been restated because it is impractical to do so.				
Self-insurance fund				
In the past the CSIR accounted for risks of a non-catastrophic nature pertaining to fixed assets by means of a provision for self-insurance. This was changed in the current year to account for these risks by means of a self-insurance fund.				
The effect of the change referred to above on accumulated funds at the beginning of the year has been as follows:				
Accumulated funds as previously reported	—	431 661	—	417 189
Adjustments relating to the years before 1996	—	7 000	—	7 000
Transfer to self-insurance fund	—	(7 000)	—	(7 000)
Accumulated funds as currently reported	—	431 661	—	417 189
The effect of the above changes resulted in an increase in net surplus for the year of R3 million (1996: R Nil).				

	GROUP		CSIR	
	1997 R'000	1996 R'000	1997 R'000	1996 R'000

4. Net operating surplus for the year before investment income

The net operating surplus for the year before investment income is arrived at after taking the following items into account:

Auditors' remuneration	899	859	854	855
Audit fees	846	809	801	805
Expenses	53	50	53	50
Exchange losses	680	920	680	920
Fees paid for services	48 546	49 834	48 546	49 834
Patent costs	1 373	1 488	1 373	1 488
Legal costs	1 525	1 777	1 525	1 777
Consultants	45 648	46 569	45 648	46 569
Board members' emoluments				
For services on the Board	130	127	130	127
Acquisition of subsidiary				
Reversal of provision for losses	—	9 173	—	—
Goodwill written off	—	(10 533)	—	—

5. Interest in subsidiaries and associate companies

Consolidated subsidiaries	Issued capital	Effective holding 1997 %	Effective holding 1996 %	Financial year-end	Shares at cost 1997 R'000	Shares at cost 1996 R'000
South African Inventions Development Corporation (SAIDCOR)	27 220	100	100	31 March	27 220	27 220
Included in SAIDCOR:						
Technology Finance Corporation (Pty) Limited (TECHNIFIN)	5 200	100	50	30 June	4 400	2 600
Included in Technifin carrying value:						
Quality Electronics Developments (Pty) Limited	1 000	76	38	30 June	—	751

Associated companies	Issued capital Rand	GROUP Effective interest 1997 %	GROUP Effective interest 1996 %	Financial year-end	GROUP Carrying amount 1997 R'000	GROUP Carrying amount 1996 R'000
Unlisted:						
Impulse Deflection Measurement (Pty) Limited	1 000	25	25	28 February	—	—
Rockradar (Pty) Limited	100	25	25	31 March	—	—
Carrying amount – note 8					—	—

INTEREST OF THE CSIR

Net indebtedness		Net investment		
1997 R'000	1996 R'000	1997 R'000	1996 R'000	General nature of business
—	—	27 220	27 220	Investment in research development and implementation of technology.
—	—	—	—	The acquisition and transfer of technology to industry by licensing new inventions, providing finance to develop technology and venture capital for the exploitation thereof.
—	254	—	1 005	Holder of intellectual property in electronic technologies. This subsidiary is not consolidated because the Board of the CSIR is of the opinion that it would be of no real value to the users of the annual financial statements in view of the insignificant amounts involved. The investment was written off during 1997.

CSIR

Cost or valuation		Indebtedness		Provision for losses		
1997 R'000	1996 R'000	1997 R'000	1996 R'000	1997 R'000	1996 R'000	General nature of business
—	—	126	126	(126)	(126)	Impulse deflection measurements.
—	—	300	300	(300)	(300)	Exploitation of intellectual property rights.
—	—	426	426	(426)	(426)	

6. Fixed assets

	1997				1996		
	Depreciation for the year R'000	Cost R'000	Accumulated depreciation R'000	Net book value R'000	Cost R'000	Accumulated depreciation R'000	Net book value R'000
GROUP							
Land and buildings	—	126 385	—	126 385	115 658	—	115 658
Development expenditure and intellectual property	—	—	—	—	5 254	5 254	—
Equipment	26 084	390 593	292 788	97 805	365 462	284 055	81 407
Vehicles	269	3 068	1 745	1 323	2 616	1 521	1 095
	26 353	520 046	294 533	225 513	488 990	290 830	198 160
CSIR							
Land and buildings	—	126 385	—	126 385	115 658	—	115 658
Development expenditure and intellectual property	—	—	—	—	5 254	5 254	—
Equipment	26 044	390 171	292 507	97 664	365 061	283 810	81 251
Vehicles	269	3 068	1 745	1 323	2 616	1 521	1 095
	26 313	519 624	294 252	225 372	488 589	290 585	198 004

	1997 Net book value			
	Land and buildings R'000	Equipment R'000	Vehicles R'000	Total R'000
GROUP				
Opening balance	115 658	81 407	1 095	198 160
Additions	12 312	46 023	497	58 832
Disposals	(1 585)	(3 541)	—	(5 126)
Depreciation	—	(26 084)	(269)	(26 353)
Closing balance	126 385	97 805	1 323	225 513
CSIR				
Opening balance	115 658	81 251	1 095	198 004
Additions	12 312	45 998	497	58 807
Disposals	(1 585)	(3 541)	—	(5 126)
Depreciation	—	(26 044)	(269)	(26 313)
Closing balance	126 385	97 664	1 323	225 372

Land and buildings are unencumbered and full details of the titles are available at the registered office of the CSIR.

	GROUP		CSIR	
	1997 R'000	1996 R'000	1997 R'000	1996 R'000
7. Income from investments				
Interest earned	35 450	34 898	29 526	29 035
Dividends from subsidiary	—	—	29 000	5 850
	35 450	34 898	58 526	34 885
8. Investments				
Loans to associate companies (note 5)	426	426	426	426
Impulse Deflection Measurement (Pty) Limited	126	126	126	126
Rockradar (Pty) Limited	300	300	300	300
Provision for losses (note 5)	(426)	(426)	(426)	(426)
Impulse Deflection Measurement (Pty) Limited	(126)	(126)	(126)	(126)
Rockradar (Pty) Limited	(300)	(300)	(300)	(300)
Investments held by Technology Finance Corporation (Pty) Limited	1 594	1 968	—	—
Fixed deposit	30 000	30 000	30 000	30 000
*** Investment in trade agreement**	5 000	5 000	5 000	5 000
	36 594	36 968	35 000	35 000

** The assets held in the trade agreement will be evaluated upon fulfilment of suspensive sale conditions when the difference between cost of R5 million and book value will be written off.*

9. Debtors and advances				
Trade debtors	88 676	69 300	87 901	68 862
Prepaid expenses	3 183	3 270	3 183	3 270
Other	17 780	21 307	17 780	21 307
	109 639	93 877	108 864	93 439

	GROUP		CSIR	
	1997 R'000	1996 R'000	1997 R'000	1996 R'000
10. Stock and contracts in progress				
Stock	3 723	4 726	3 625	4 691
Contracts in progress	23 955	18 246	23 955	18 246
	27 678	22 972	27 580	22 937
11. Advances received				
Advances on contracts received from clients	5 021	5 732	4 813	5 414
12. Creditors and provisions				
Trade creditors	61 055	44 793	59 687	44 793
VAT payable	4 833	4 387	4 833	4 387
Provision for insurance excess	2 550	501	2 550	501
Provision for accumulated leave	18 754	17 108	18 754	17 108
Provision for property maintenance	4 826	7 213	4 826	7 213
Provision for redundancy payments	5 426	4 213	5 426	4 213
Other	6 728	22 034	6 728	15 724
	104 172	100 249	102 804	93 939
13. Long-term liabilities				
Unsecured				
IDC	7 113	7 466	—	—
	7 113	7 466	—	—
14. Short-term loan				
Loan from SAIDCOR	—	—	14 932	—

The interest-free loan is repayable annually commencing 30 June 1996 in amounts equal to 45% of the net royalty income and/or the net deemed royalty income from specified projects. The loan repayment will be terminated at the earlier of 30 November 2002 or the date upon which the repayments exceed the loan amount.

This is an interest-free loan.

15. Retirement benefits of employees

CSIR Pension Fund

The Fund is registered in terms of the Pension Funds Act, 1956 and is a defined contribution plan. The CSIR liability to the Fund is limited to paying the employer contributions. Life cover and dependants pensions are fully secured by a continued income and life insurance policy.

Employer contributions of R18,1 million (1996: R20,3 million) and employee contributions of R11 million (1996: R9,9 million) were paid over during the year. Employer contributions are charged against income.

Mine Officials Pension Fund and Chamber of Mines Pension Fund

At the time of the merger with the Chamber of Mines Research Organization in 1993 certain COMRO employees elected to remain members of the Mine Officials Pension Fund and Chamber of Mines Pension Fund. In terms of the agreement with the Chamber of Mines this election holds no liability for CSIR other than paying the monthly employee contributions.

In respect of the employees who have formally converted their secondment to a CSIR appointment, employer contributions of R1,9 million (1996: R2 million) and employee contributions of R755 000 (1995: R784 000) were paid over during the year.

Associated Institutions Pension Fund and Temporary Employees Pension Fund

These Funds are defined benefit plans. The formula used to determine pensions is based on the pensionable earnings of the final year, and the aggregate period of uninterrupted membership.

The CSIR has 53 employees who are members of the AIPF and 10 employees are members of the TEPF. Both funds are controlled by the State which has assumed responsibility for the unfunded portions of these Funds.

Employer contributions of R534 614 (1996: R434 000) and employee contributions of R222 879 (1996: R1,2 million) were paid over during the year to the Associated Institutions Pension Fund and Temporary Employees Pension Fund. Employer contributions are charged against income.

Post-retirement medical benefits

The CSIR formed its own medical aid scheme with effect 1 April 1997. Based on managed health care principles, with a strong emphasis on co-responsibility between employer and employee, the objective is to provide sustainable health care and simultaneously limit the cost, present and future, to a level which is affordable.

The CSIR Board approved a cash resource of R190 million (1996: R Nil), the proceeds of which will substantially cover the actuarial valuation of the liability for post-retirement medical benefits of R280 million (1996: R240 million). The actuarial valuation was carried out in January 1997.

The unprovided portion of the liability is to be funded by an increase in future contributions to the medical aid scheme.

16. Insurance and risk management

The insurance and risk management policies adopted by the CSIR are aimed at obtaining sufficient cover at the minimum cost to protect its asset base, earning capacity and legal obligations against unacceptable losses.

All fixed assets are insured at current replacement value. Risks of a possible catastrophic nature are identified and insured while acceptable risks of a non-catastrophic nature are self-insured. Self-insurance has been instituted where the cost to benefit relationship exceeds the risk and the incidence of losses are of a minor and infrequent nature. Self-insured risks are reviewed on an annual basis to ensure cover is adequate. An amount of R10 million (1996: R7 million) is held in a self-insurance fund to cover these risks. This amount is disclosed as part of accumulated funds in the balance sheet. No major losses were experienced during the year under review. Claims of a general nature were adequately covered.

	GROUP		CSIR	
	1997 R'000	1996 R'000	1997 R'000	1996 R'000
17. Contingent liabilities				
There are contingent liabilities in respect of				
– Bank guarantees in respect of third party liabilities	4 544	828	4 544	828
18. Capital commitments				
Authorised but not contracted	10 172	—	10 172	—
This capital expenditure is to be financed from internal sources				