

# TERTIARY EDUCATION NETWORK

## Annual Report

Covering the period 1 January 2002 – 31 December 2002

### **Foreword by the Chairperson**

This is TENET's second Annual Report. The first one covered the period from the Company's inception on 22 August 2000 to the end of 2001, throughout which period Internet access services to institutions were being commissioned. By contrast, this Annual Report for 2002 covers a full year of normal operations, and so gives a good impression of the value that TENET adds to the higher education and research institutions, both through the HEIST agreement with Telkom and through its other activities.

TENET's overall accomplishments during the 12-month period are indeed impressive. It is clear that TENET has fulfilled its promise as an agency that would substantially improve Internet access and related institutional capacities for all the institutions that it serves. This is the result of a very high degree of professionalism and hard work by the staff of TENET.

I am particularly pleased at the growth in Internet connectivity to technikons and universities that has been stimulated by TENET's Internet Access Development Program. This Program uses funds as an incentive to higher education institutions to increase their own Internet access budgets. Taken together, the 28 participating institutions will increase their Internet access budgets by over 70% over the next three years. Also using donated funds, and in association with the National Research Foundation, TENET launched the Development of IT Capacity in Higher Education (DITCHE) Program. This Program aims to develop the knowledge and skills of support staff and academics at universities and technikons.

Funding for both of these programs derives mainly from donations from The Andrew W Mellon Foundation and The Atlantic Philanthropies, as previously reported. We are most grateful to these two donor foundations for their generous donations.

TENET holds the donations in trust, and reflects them as a designated fund on TENET's balance sheet. The donated monies are held in bank deposits quite separately from TENET's own cash assets. All interest earned on these deposits accrues to the designated fund. Movements in the fund are detailed as notes to the balance sheet.

It is a pleasure to thank each TENET Director for his or her contributions to the company during the year under review, and especially to Prof Roy du Pré and Mr Henry Watermeyer, who retired as Directors. As newly appointed Directors during the year under review, the Board welcomed Prof Brian Figaji, who succeeded Prof Du Pré as the CTP's nominee to the Board, and Ms Yvette Canham, who succeeded Mr Watermeyer as the Director with special responsibility for representing the interests of IT Directors of universities and technikons.

Stuart J Saunders

*Chairperson*

### **Identity**

Tertiary Education Network (TENET) was incorporated as an association under Section 21 of the Companies Act on 22 August 2000. TENET is also registered as a nonprofit organisation in terms of the Nonprofit Organisations Act.

Company registration number: 2000/020780/08

Nonprofit organisation registration number: 014-801 NPO

Address: 46 Rouwkoop Road, Rondebosch 7700, Republic of South Africa.

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### Purpose of the company

The main purpose of the company is to secure, for the benefit of South African universities, technikons and associated research and support institutions, Internet and information technology services, based upon a customer-specific broadband transport network. This involves entering into and managing contracts with service providers and institutional users, carrying out ancillary operational functions in support of service delivery and providing other value-added services as may from time to time be needed in support of the higher educational and research sector in South Africa. In addition, the company receives donations for and on behalf of public higher education institutions.

### Members

As a Section 21 company, TENET has no shares or shareholders, and its liabilities are limited to specific personal guarantees made by its Members. TENET's articles of association provide for the Committee of Technikon Principals (CTP) and the SA Universities Vice-Chancellors Association (SAUVCA) each to nominate four Members.

The people who were Members of TENET during the reporting period are listed in the following table.

Name	Nominated by	Appointment date	Retirement date
Balintulo, Prof M M	CTP	1 Mar 2002	
Bally, R	SAUVCA	1 Mar 2002	
Du Pré, Prof R H	CTP	26 Jul 2000	30 Sep 2002
Figaji, Prof B de L	CTP	1 Oct 2002	
Gourley, Prof B M	SAUVCA	26 Jul 2000	28 Feb 2002
Khoapa, Prof B	CTP	26 Jul 2000	
Kotecha, Ms P	SAUVCA	26 Jul 2000	
Naicker, P N	SAUVCA	1 Mar 2002	
Snyman, Prof H C	CTP	26 Jul 2000	
Swartz, Prof D	SAUVCA	15 Mar 2001	
Van Rensburg, Prof D J	CTP	26 Jul 2000	31 Jan 2002
Van Wyk, Prof A H	SAUVCA	26 Jul 2000	28 Feb 2002

### Directors

TENET's articles of association provide that at any time there shall be at least five and at most nine directors. Directors are appointed at AGMs or by co-option to the Board. All directorships expire at the following AGM.

The directors who held office during 2002 are listed in the following table.

Name	Appointment date	Retirement date
Canham, Y	1 Jun 2002	
Du Pré, Prof R H	17 Aug 2000	30 Sep 2002
Figaji, Prof B de L	1 Oct 2002	
Kaniki, Prof AH	1 Jan 2002	
Kotecha, Ms P	17 Aug 2000	
Leatt, Dr J V (Deputy Chairperson)	17 Aug 2000	
Martin, Dr D H	17 Aug 2000	
Nygren, T I (USA)	30 Aug 2000	

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Saunders, Dr S J (Chairperson)	17 Aug 2000	
Shrock, H	1 Jan 2002	
Watermeyer, H C	17 Aug 2000	31 May 2002

### Officers

Chief Executive Officer and Public Officer: Duncan H Martin, PhD MBL

Executive Officer: Systems and Operations: J Franz Dullaart.

Executive Officer: Capacity Development Programs (from 1 Jan 2003): Duncan B Greaves.

### Institutions for which TENET acts as agent

The following table lists the institutions for which TENET acts as agent in terms of an agency agreement, as at 31 December 2002. The number of campuses with HEIST connections is shown in brackets after the institution's name.

Border Technikon (1)	Technikon Northern Gauteng (1)
Cape Technikon (1)	Technikon North-West (1)
Council on Higher Education (1)	Technikon Pretoria (7)
Durban Institute of Technology (3)	Technikon SA (1)
Eastern Cape Technikon (1)	Technikon Witwatersrand (4)
Eastern Seaboard Association of Tertiary Institutions (1)	Tertiary Education Network (2) <sup>5</sup>
Fort Cox College of Agriculture and Forestry (1)	University of Cape Town (1)
Foundation for Education, Science and Technology (1) <sup>2</sup>	University of Durban-Westville (1)
Hartebeesthoek Radio Astronomy Observatory (1)	University of Fort Hare (2)
Human Sciences Research Council (1)	University of Natal (3)
iThemba Laboratory for Accelerator-based Sciences (1) <sup>3</sup>	University of Port Elizabeth (1)
Iziko Museums of Cape Town (1)	University of Pretoria (3)
Mangosuthu Technikon (1)	University of South Africa (1)
Medical Research Council (1)	University of Stellenbosch (1)
Medical University of South Africa (1)	University of Swaziland (1)
National Botanical Institute (1)	University of the Free State (2)
National Library of South Africa (2)	University of the North (1)
National Research Foundation (2) <sup>4</sup>	University of the North-West (1)
National University of Lesotho (1)	University of the Western Cape (1)
Peninsula Technikon (1)	University of the Witwatersrand (1)
Port Elizabeth Technikon (1)	University of Transkei (1)
Potchefstroomse Universiteit vir CHO (1)	University of Venda (1)
Rhodes University (1)	University of Zululand (2)
SA Astronomical Observatory (1)	Vaal Triangle Technikon (1)
SA Bibliographic and Information Network (1)	Vista University (1)
Technikon Free State (4)	

#### Notes

- 1 Rand Afrikaans University is not listed in this Table because it joined the TENET family of institutions only on 23 January 2003. From that date, all 35 South African public higher education institutions have been participants.
- 2 Now incorporated as a unit of the National Research Foundation.
- 3 Formerly called the National Accelerator Centre.
- 4 The two sites are the NRF's Head Office in Pretoria and the Hermanus Magnetic Observatory.
- 5 TENET has two HEIST sites, located at UCT and at WITS, where TENET's web and domain name servers are located. TENET is grateful to UCT and WITS for hosting these servers.

## **Bankers**

Commercial: Standard Bank of South Africa Limited

Investment: Cape of Good Hope Bank

## **Auditor**

KPMG Inc.

## **Attorney**

Richard Rosenthal Attorneys

## **Donors to higher education through TENET**

The Directors are grateful to the National Research Foundation for a special donation of R257 802, to be used for the benefit of participating institutions through the DITCHE Program. This donation was made by the NRF from funds available to it following the winding up of the erstwhile UNINET Project.

As was reported in the first annual report, TENET also manages donations of US \$1 million from The Andrew W Mellon Foundation and €1.2 million from The Atlantic Philanthropies, both made during 2001, for the purposes of purchasing additional Internet access bandwidth for the institutions and for building greater capacity in the previously disadvantaged institutions to develop and operate their campus networks. Reports on these activities are included below.

## **CEO's Review of Operations**

### ***Executive Summary***

TENET's second year of operations has seen the supervision and administration of the Higher Education Internetworking Solution with Telkom settle into an efficient operation that provides effective support to the institutions. It has also seen rapid developments in TENET's adjunct roles of applying its significant donated funds for the benefit of higher education, in administering the AC.ZA domain, and in managing the assignment of large tracts of Internet address space in South Africa.

In addition, TENET has been involved in a government initiative to found a national research and education network that would connect to the European Commission's Géant network, and has sponsored expert legal advice and associated document templates that institutions need in consequence of recent "e-legislation".

The overall growth in the Internet access bandwidth available to higher education and research institutions has been particularly pleasing. Having been some 9 Mb/s in March 2001, Internet traffic flowing into participating institutions from international sources peaks, two years later, at over 60 Mb/s.

The donor-funded Internet Access Development Program, which came into full operation during 2002, has stimulated this growth significantly.

### ***Contractual framework***

#### ***The HEIST agreement***

TENET's principal function is to act as the agent of each of over fifty higher educational and associated institutions as customers for Internet access services from Telkom SA Limited.

Telkom provides Internet access services to participating institutions in terms of a service agreement between Telkom and TENET that is known as the Higher Education Internetworking Solution with Telkom, or "the HEIST agreement". This agreement was signed in December 2000.

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It is important to note that the HEIST agreement is not an agreement for the rental of various circuits from Telkom, but for the provision by Telkom of Internet access services. The entire infrastructure of circuits and routers is provided, controlled and operated by Telkom, and TENET has no operational role whatsoever as regards the delivery of the services.

The HEIST agreement distinguishes three partitions of the Internet:

- the HE partition, comprising the campus networks of the participating institutions, which are interconnected by Telkom under the HEIST agreement;
- the National partition, comprising networks connected to other South African Internet service providers with which Telkom has peering points in South Africa; and
- the International partition, comprising basically the rest of the Internet, which is reached via Telkom's peering points in the UK and the USA.

The agreement specifies the price, in rands per month per kbps of committed information rate (CIR), for each of these services, and no other Telkom charges apply. Telkom guarantees the availability of bandwidth on demand up to the CIR value. In addition, the HEIST agreement, as amended, specifies that bandwidth of the local access circuit shall not be less than twice the largest of the three CIRs nor less than the sum of the three CIRs. Consequently traffic speeds to or from the institution can exceed the CIRs when there is sufficient otherwise unused capacity on the physical links.

Telkom provides and operates the local access circuit to each site, including the access router. Telkom also configures and operates the network of permanent virtual circuits and core routers that interconnect the TENET sites with each other and connects them to Telkom's national and international gateway routers and thence to the Internet generally, both locally and abroad.

Each participating institution places orders through TENET for specific committed information rates for data traffic between its campus and each of these three Internet partitions.

Finally, the HEIST Agreement includes qualitative service levels and penalties covering times to install or upgrade services, times taken to restore faulty or degraded services, and network latencies.

### ***Participating institutions***

Throughout this review I refer to institutions that have appointed TENET as their agent for the procurement of Internet access under the HEIST agreement as "participating institutions". The list that appears earlier in this Report shows that 75 sites, including satellite campuses, of 51 institutions were connected to the Internet in this manner by the end of 2002.

Telkom and TENET have agreed an amendment to the clause in the HEIST agreement that delimits which further institutions may apply to TENET for Internet access services under the HEIST agreement. The first criterion is that the applicant must be registered as a higher education institution in terms of the Higher Education Act or must have scholarly research as a prime purpose and must interact extensively in this regard with higher education in South Africa. The second requirement is that if the applicant is a private body, it must be registered as a nonprofit organisation in terms of the Nonprofit Organisations Act.

In all cases, participation is subject to the conclusion of an agency agreement with TENET.

### ***The agency model***

In its role as the appointed agent of each participating institution, TENET handles all interfaces and communications with Telkom on behalf of the institutions, with the exception of operational fault reporting and handling. TENET informs and advises the institutions about services and prices, receives order instructions from institutions, places the orders on Telkom, manages Telkom's performance throughout the installation process, advises the institution when it should test the installation, and then agrees the acceptance date with the institution and informs Telkom.

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TENET also handles all administrative processes with Telkom on behalf of the institutions, including sending detailed monthly statements to each institution in which the charges that are due to Telkom and the agency fees that are due to TENET are set out, receiving payments of both kinds from the institutions, receiving and reconciling Telkom's invoices with the order book and, finally, making payments to Telkom on behalf of the institutions.

TENET has built and uses a comprehensive database and information system to enable and support these administrative processes.

### **Agency fee**

TENET covers its operational costs through an agency fee that is charged monthly to participating institutions. TENET's Board sets the agency fee from time to time as a percentage of Telkom's service charges. Initially set at 14%, the agency fee was reduced to 11% of the HEIST service charges from 1 March 2002 and again to 9% from 1 March 2003.

### **Internet access operations**

#### **Growth in orders and traffic flows during 2002**

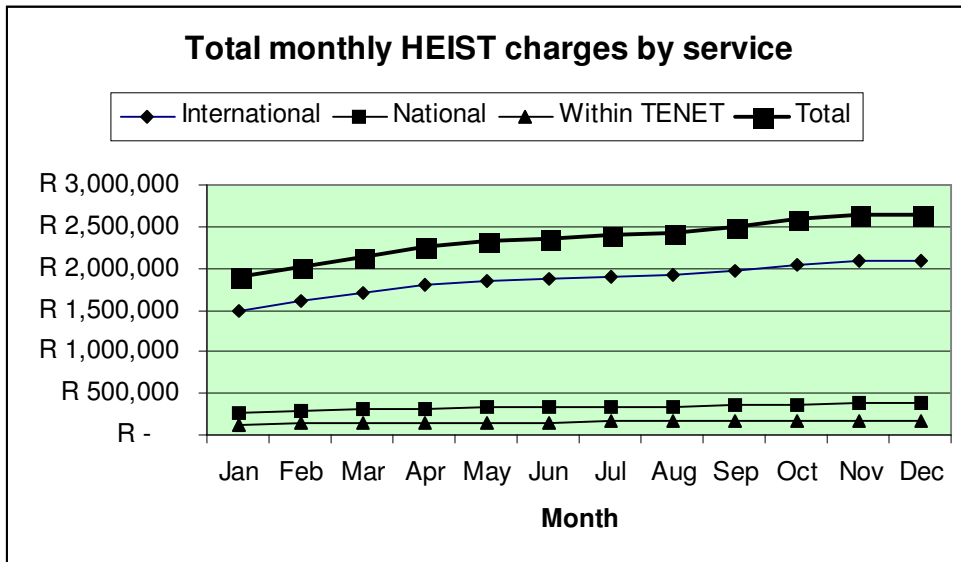
The commissioned HEIST service capacity grew steadily throughout 2002, as did the volumes of data traffic entering and leaving the campus networks of participating institutions.

A characteristic feature of Internet use by education and research institutions in countries that are remote from the USA and Europe is the proportion of traffic that flows into their networks from international sources. Totalled across all participating institutions, three times as much data comes from overseas sources as comes from South African ones. Traffic between participating institutions is comparatively very little. When this effect is coupled to the fact that international bandwidth costs three times as much as local bandwidth, it is not surprising that almost 80% of the cost to institutions is associated with the International service. The following table shows the breakdown of charges, totalled across TENET.

<b>Total HEIST charges during 2002 (excl VAT)</b>			
<b>International</b>	<b>National</b>	<b>Within TENET</b>	<b>Total</b>
R 22,352,651	R 3,995,852	R 1,860,365	R 28,208,868
79.2%	14.2%	6.6%	100%

The following chart of monthly charges by Telkom for HEIST services reflects a steady growth at an annualised average rate of almost 40%. The figures on which the graphs are based exclude TENET's agency fee and VAT.

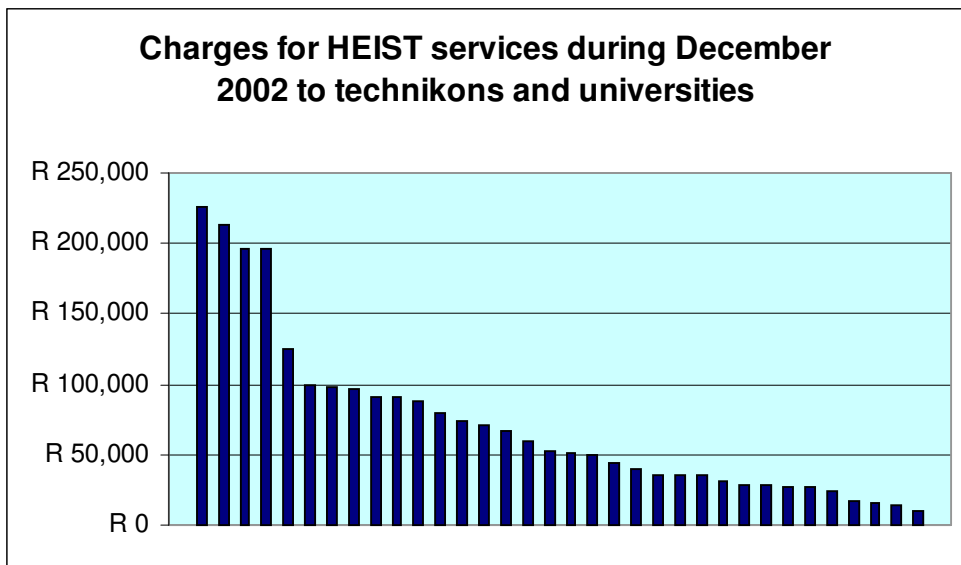
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To a considerable extent, the Internet Access Development Program (IADP), as reported upon later, stimulated the growth reflected here.

While the 34 participating South African technikons and universities comprise only two thirds of the participating institutions, they use no less than 92% of the total HEIST service capacity.

Within the group of 34 participating South African technikons and universities there are still large differences in the amount of HEIST services that they use. Each bar on the following chart represents one of these institutions, and the height of the bar represents the charge to the institution for HEIST services during December 2002.



The four tallest bars are the Universities of Witwatersrand, Cape Town, Pretoria and Natal, in that order. The eight tallest bars together account for more than 50% of the total charges. The median charge is R 51,750 per month.

### ***Growth of spam and hacker attacks***

A feature of operations during 2002 has been the meteoric rise in volumes of inbound email spam and the sporadic compromising and abuse of campus networks, particularly by spammers who use compromised servers to send bulk unsolicited email to other parties. The evidence that TENET has seen of campus networks having been compromised is the sudden occurrence of abnormally high outbound traffic flows from such networks. Investigation by staff of the institution concerned has invariably turned up one or more poorly

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configured servers that have been detected and used by spammers or other hackers. In one case, an unknown hacker used a campus network as an intermediary “smurf amplifier” from which a service denial attack was mounted against a target network elsewhere.

### ***Telkom’s performance***

#### Service reliability

Overall, participating institutions have enjoyed very satisfactory Internet access operations during 2002. While there were short-lived service disruptions from time to time, none lasted so long that it had to be managed as a formal contractual incident.

#### Traffic speeds

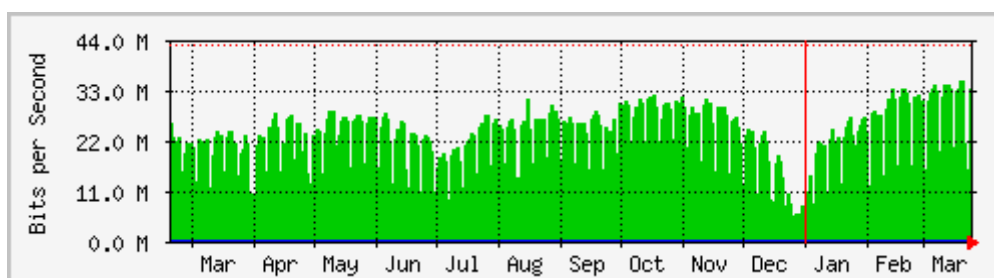
Telkom attended most satisfactorily to two systemic service shortcomings during the year. The first followed the realisation by several sites that inbound traffic seemed unable, under any circumstances, to rise above about 170% of the CIR, whereas the HEIST agreement provides for traffic flows to rise up to twice the CIR when there is sufficient spare capacity on the local access link. Investigation showed that the overhead of encapsulating IP packets within ATM packets was the cause of the problem. Telkom accepted that this overhead should not be for the customers’ accounts and modified the configuration of all ATM circuits accordingly.

The second shortcoming was the limitation of traffic speeds on the inbound trans-Atlantic circuit to the cumulative total of ordered CIRs, whereas the HEIST agreement provided for Telkom to apply its spare capacity to permit bursting above this value. The HEIST Network Administrator, Arrie Bezuidenhout, remedied this in a noteworthy manner. Realising that Telkom’s second-tier ISPs use more bandwidth at night, whereas TENET institutions collectively use far more during the day than at night, he arranged for spare daytime capacity on the satellite link serving these ISPs to be made available to the HEIST network. This required the use of time-based access control lists on the routers involved. The plan worked very well and enabled inbound trans-Atlantic traffic to rise systematically to over 53 Mbps at peak times – well in excess of the cumulative CIRs reported above.

The graph below shows the pattern of inbound international traffic speeds, summed over all sites and averaged over 24-hour periods, for the period March 2002 to March 2003. The increase that occurred at the beginning of October 2002 resulted from these actions.

### **Inbound International Traffic Speeds**

*(summed over all sites and averaged over 24-hour periods)*



#### Network latencies

Throughout 2002 all inbound international traffic, including packets originating in Europe, traversed space segments across the Atlantic from major Internet peering points in New York. All out-bound international traffic traversed undersea cable circuits to the UK and thence to peering points in New York. Network latencies between LANs of participating institutions and networks in the USA were typically between 500 msec and 600 msec, and sometimes greater. The HEIST agreement specifies as a norm that ping times to the USA should not be systematically greater than 600 msec.

These latencies will be considerably reduced when in-bound international traffic is carried on the new SAT-3 cable rather than on satellite circuits. The SAT-3 cable was commissioned



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during May 2002, and TENET was disappointed that the long-awaited migration to the cable, which was foreseen in TENET's first annual report, did not occur during 2002 and has still, at the time of writing, not occurred.

### Installation times

The one area in which Telkom's performance fell short of the contracted service levels quite frequently was the time taken to carry out new installations and major upgrades.

### Acknowledgement

It is a pleasure to acknowledge the dedication, initiative and hard work of Telkom managers and staff. This includes the Managing Executive: Business and Government Markets *Godfrey Ntoele*; Executive: Product Development and Marketing *Dan Winters*; Executive: Government and Key Accounts *Sisi Dhlamini*; Customer Account Manager *Cornel Bezuidenhout*; Service Manager *Ernst Visagie*; Network Administrator *Arrie Bezuidenhout*; Help Desk Specialist *Jeremiah Nkabinde*, and other members of the Sales and CNC teams that look after the HEIST services and their users.

### **Operational support services to participating institutions**

#### Telkom's Customer Network Care service

The HEIST agreement provides for Telkom to monitor the service delivery 24 hours per day, seven days per week, to provide a technical help desk service directly to network managers at each institution, and to alert TENET about all faults and fault management events. This Customer Network Care service is provided from Telkom's National Network Operations Centre (NNOC) at Centurion, and continued to be very effective throughout 2002. Network support personnel at participating institutions interact directly with operators at the NNOC Helpdesk, who know the HEIST network well. The power of this central support organisation to trigger and manage repair activities at remote locations has been noteworthy.

#### TENET web sites

TENET's main web site (<http://www.tenet.ac.za>) includes TENET's Home Page and provides access to all web-based services offered by TENET as well as links to pages that provide diagnostic tools and related information. The web server, [protea.tenet.ac.za](http://protea.tenet.ac.za), is kindly hosted by the University of Cape Town.

In addition, a new HEIST Operational Information web site was established during 2002 to provide redundancy in the measurement and reporting of technical network performance statistics. The web server, [ixia.tenet.ac.za](http://ixia.tenet.ac.za) is kindly hosted by the University of the Witwatersrand. Both it and HEIST Operational Information page at the main site display graphs and tables that reflect the evolving history of traffic flows, CPU and memory usages on routers, and Ethernet collision counts on the router's LAN interfaces. The two sites present the same operational information in the same formats, but gather the data independently of each other. Operational information can be viewed at either site, and no restriction is placed on who may view this information.

#### Contact information

During 2002 TENET deployed two new operational information systems. The first has been dubbed TENIS – TENET Information System. It is a comprehensive, web-based system that is accessed from TENET's main website and manages "contact" information about institutions, sites, roles and persons. Such information can be entered or updated via the website by suitably authorised persons at each institution, and all participants, including Telkom support staff, can view contact information.

#### Fault alerts and reports

The second information system, which was developed jointly with Telkom engineers, emails alerts and reports about fault conditions on any of the many circuits that comprise the HEIST network to network managers at sites that are affected by the fault. Registered users of the TENIS system can also view details of these reports on TENET's main web site.

A feature of the system is the use of the extended mark-up language XML to define data exchange formats between Telkom's UNIBase fault management system, where fault

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information originates, and TENET's system, which distributes the information to the right network managers.

### Acknowledgement

The Executive Officer: Systems and Operations, Franz Dullaart, built all TENET's systems that provide information about network operations.

### ***Negotiations with Telkom concerning inter-campus connectivity***

By the end of 2002, TENET had still not succeeded in concluding a satisfactory agreement with Telkom covering the "point-to-point" circuits that typically link satellite campuses to their institution's main campus. While a "main agreement" regarding such circuits was finalised in October 2002, the principal annexure, which describes the service offerings and pricing models, was still under intense negotiation at the year-end.

The structure of the main agreement is such that an institution can request Telkom, through TENET, to undertake an analysis of its wide area networking needs and then to make a comprehensive service proposal. Only if and when the institution accepts the proposal does it commit itself to the terms of the agreement.

I am hopeful that the full agreement will be concluded early in 2003 and that it will bring significant benefits for a good number of institutions.

### ***Capacity development Programs***

#### ***The Internet Access Development Program (IADP)***

The Internet Access Development Program makes **additional** Internet access bandwidth available for specified periods to higher education institutions in South Africa. The Program offers to make grants that cover the costs of additional Internet access bandwidth, conditional upon the institution making a contractual commitment to grow its own Internet access budget systematically over a period of four years. The total amount of an institution's grant budget was proportional to the amount in excess of 7% per annum rate at which it was prepared to grow its own budget. In addition, a cap of R720 000 per institution was set on such budgets. This model enabled much larger grants, in relative terms, to go to institutions with small Internet budgets.

In response to the invitation to bid for an IADP grant, 31 institutions submitted proposals, and IADP agreements were ultimately entered into with 26 institutions. By the end of 2004, these 26 institutions, taken together, will have grown their own monthly expenditure on Internet access from R1.7 million in March 2001 to R 2.9 million – a growth of 73%. While they were doing so, TENET will have made grants to them totalling R 12 584 000, which grants will have enabled each of them, as an incentive, to grow its orders for HEIST services ahead of its own budget capacity.

#### ***The DITCHE Program***

The National Research Foundation (NRF) and TENET jointly conceived the *Development of Information Technology Capacity in Higher Education* (DITCHE) Program. DITCHE aims to improve the quality and effectiveness of network and other IT operations at those universities and technikons that wish to have assistance in this regard, primarily by organising and funding the development of the knowledge and skills of IT support staff and managers.

In terms of an agreement between the NRF and TENET, the DITCHE Program commenced formally on 1 February 2002. It was funded mainly by TENET and managed and executed by the NRF, which appointed Mike Lawrie as the Program Manager.

The Program conducted two major projects in 2002.

#### ***Technical Books Project***

The Technical Books Project is intended to facilitate the acquisition of technical books by institutions, particularly texts related to network management and configuration. Mike Lawrie

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negotiated very significant discounts with key publishers. Unfortunately, although the project was widely advertised, there was no uptake within the available timeframe. The reasons for this are not entirely clear and require exploration. TENET remains convinced that it is worthwhile to facilitate access by technical staff to good quality learning and reference materials.

### The Techie Event

The Techie Event was held over three days during August 2002 in Port Elizabeth. It had two objectives: first, to share experiences and to pass on skills; and second, to encourage human networking among the attendees. In this it was an overwhelming success and was received with acclaim by its participants. More than eighty people participated, most of whom were IT staff from technikons and universities. The majority of session presenters were drawn from the same group. The program itself consisted of thirty sessions, organized into three tracks; the content leaned heavily (and appropriately) towards technical issues in network management but also included a range of general or special interest topics outside this technical domain.

### Acknowledgement

TENET is very grateful to Mike Lawrie for getting the DITCHE Program underway and especially for conceiving, arranging and leading the very successful Techie Event.

### **Management of Capacity Development Programs in 2003 and beyond**

Mike Lawrie unexpectedly left the employ of the NRF at the end of August 2002. The Program came to a temporary standstill while TENET reviewed its objectives and strategy. As a result, at its meeting in November 2002, the Board resolved to reformulate the DITCHE Program in three major ways:

- A. In addition to developing IT support capacity, DITCHE should develop the HEIs' capacity to use information technology effectively in teaching, learning and research;
- B. DITCHE should be developed into an enduring program;
- C. TENET should take direct responsibility for managing the Program.

The NRF readily agreed to the termination of the DITCHE Agreement with TENET and to placing the DITCHE Program under TENET's direct management. The NRF remains identified as a donor to the DITCHE Program.

TENET created a new post of Executive Officer: Capacity Development Programs, and was pleased to welcome Duncan Greaves into this position from 1 January 2003. He is responsible for the IADP and DITCHE Programs.

## **Proposed National Research and Education Network**

### **NRENs and interconnect networks**

The past five years have seen the emergence of national research and education networks (NRENs) in many countries, and of "interconnect" networks such as the European Commission's Géant network, that interconnect NRENs at gigabit speeds. Unlike the HEIST or general Internet connections provided by ISPs, being connected to an NREN does not provide connectivity to the Internet generally, but only to other institutions that connect to the same NREN or to other NRENs with which traffic is exchanged via an interconnect network such as Géant. The purpose is to provide uncongested channels for high speed, high volume exchange of data between research institutions. Traffic on NRENs and on interconnect networks is subject to Acceptable Use Policies that preclude traffic to or from the "commodity" Internet. Through Géant, and its links to Internet2 in the USA, over 3 000 universities and research institutions in over 30 countries are interconnected in this manner.

### **A South African NREN?**

For some time the European Commission (EC) has been encouraging the Department of Science and Technology (DST) to apply for a South African NREN to connect to Géant. At the invitation of DST, I attended the Research Networking Global Summit conference in

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Brussels in May 2002, and participated in a meeting with senior EC officials. The DST is promoting the concept of a South African NREN at the highest levels in Government. It has also secured the formal approval of the EC for the proposed connection to Géant, and is embarking on a process of consulting stakeholders.

The constitution, organisation and resourcing of the NREN remain undecided.

TENET's Board believes that a well-configured and well-run South African NREN would provide a huge stimulus to research and the training of researchers in South Africa. It strongly endorses the DST's efforts to generate support for the establishment and funding of an NREN. The Board further believes that TENET has the knowledge and experience to take on the tasks of making the NREN happen in design, business and contractual terms, and subsequently of driving the contractual and administrative relationships with participating institutions and with the telecommunications operators and other suppliers that would operate the NREN. Such roles would be similar to those that it plays vis-à-vis the HEIST and also similar to those played by the company Dante plc on behalf of the EC in the management of Géant.

### ***Administration of the AC.ZA domain***

TENET has administered the AC.ZA domain space since 1 March 2001. It is a moderated domain that is reserved for higher education and associated research and support institutions that are domiciled in South Africa.

During 2002 the total number of active third level domains in AC.ZA rose from just over 100 to 130. Compared to the hundreds of thousands of third level names in CO.ZA, this is a very tiny number. However, the total number of domain names and host names at all levels in AC.ZA is much larger, and of course, the number of email addresses that end in AC.ZA (in particular, those of staff and students at technikons and universities) is huge!

TENET is grateful to the University of Cape Town for hosting the primary name server for AC.ZA. Although located there, the name server is not connected directed to UCT's campus network, but to a separate LAN operated by TENET and connected directly to the HEIST network. TENET's Franz Dullaart takes care of all name server updates and related operational matters.

### ***Government takes responsibility for the ZA domain***

It is well known that Mike Lawrie has administered South Africa's top-level country code domain - the ZA domain – since its inception. He has done so as a labour of love, in his own time and without seeking or receiving compensation of any sort. For this, and for his seminal contributions to the establishment of academic internetworking, and indeed, the Internet, in South Africa, the entire community represented by the institutions that work with TENET is deeply indebted and grateful to Mike.

As part of the Electronic Communications and Transactions Act, which became law during 2002, the Government prepared the way for its taking control of the administration of ZA. A new Section 21 company called the ZA Domain Authority is to be created for this purpose. Officials of the Department of Communications invited me, as Administrator of AC.ZA, to a meeting to afford me an opportunity to brief them about AC.ZA and to exchange views on matters of policy and procedure. This meeting was cordial and constructive. Once the ZA Domain Authority has been brought into existence, TENET will do whatever is reasonably required to build a sound working relationship with the Authority.

### ***Involvement with Namespace ZA***

Namespace ZA is an organisation that is in the process of registering as a Section 21 company, and was originally formed by non-governmental role players in the Internet industry for the express purpose of administering of the ZA domain in a post-Lawrie era. It is now clear that this will not happen, but Namespace ZA is trying to play a helpful, facilitational role in the transition to the era of the ZA Domain Authority.

At the AGM of Namespace ZA, held on 13 September 2002, I reported on AC.ZA role and operations, and was nominated to the Board. Following a tie in the voting, I stood down, but

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was subsequently co-opted to the Board, and have since participated in several teleconferenced Board meetings. The Department of Communications and Namespace ZA jointly arranged a workshop, in which I participated, on the policies that should guide the administration of the ZA domain.

### ***IP Address Space Administration***

#### ***Project Curla***

TENET is responsible to the American Registry for Internet Numbers (ARIN) for the administration of the eight so-called "UNINET Project" blocks of IP address space. This responsibility includes ensuring that the Internet's "whois" databases are kept current as regards the identity and contact details of the assignees of blocks of address space and also ensuring that the Internet's domain name service (DNS) is furnished with so-called pointer records that show, for each IP address, the name of the host that is using that address.

For historical reasons, many whois records have not been updated since the early 90's and many address blocks have no pointer records at all. These gaps seriously impair the ability of network administrators everywhere to identify and find contact details of the organisations whose IP addresses appear as sources or relays of spam or other abusive communications. In particular, as is happening with ever increasing frequency, when spam is generated at or relayed from a UNINET Project address, these gaps leave the offended party – the recipient of the spam – unable to identify or contact the offending party and so with no option but to complain to TENET itself.

Consequently, in August 2002, at the Internet Week conference in Johannesburg, TENET announced Project CURLA (Clean Up of Reverse Look-ups and ARIN whois), which aims to bring the pointer records and the ARIN whois records up to date for the eight UNINET Project IP address blocks. Although quite daunting in its scope, it is essential to do this work, and the project has been generally welcomed by local ISPs.

TENET has contracted Mariana Swart to undertake this work, and she has made good progress in identifying the required corrections to the ARIN whois database. She also contacts and offers assistance to assignee organisations that need to create or update pointer records.

#### ***Preparing for the next generation Internet protocol – IPv6***

For the past decade, top Internet planners have feared the exhaustion of the supply of unallocated Internet addresses. For this and many other reasons, a next generation Internet Protocol, called IPv6, was been devised, tested and standardised. It is now supported by equipment vendors and is available for deployment. A number of major commercial ISPs in South Africa are already routing IPv6 packets on their backbone networks, and are keen to see the HEIST network able to do so as well and to exchange IPv6 traffic.

While migration of end-users' LANs to IPv6 cannot be seen as urgent, the traditionally pioneering role of higher education institutions in Internet matters should not be forgotten. The Internet in South Africa started at Rhodes University, and UNINET was the first local network to carry IP packets. A similar pattern was evidenced in many countries. It would be welcomed by the Internet industry and be of great value if higher education institutions in South Africa were to pave the way through experimentation and early adoption of IPv6.

With this in mind, TENET applied to the American Registry for Internet Numbers (ARIN) to be appointed as a Local Internet Registry for IPv6, to serve the local higher education and associated research and support institutions. ARIN approved the application and allocated an "ISP-sized" block of IPv6 Internet address space for this purpose.

Specifically, ARIN has allocated a /32 block of global unicast IPv6 address space, from which TENET may assign standard /48 prefixes to participating institutions. This extends and continues the role that TENET, and UNINET before it, played with regard to the current generation of class C IP address space. Participating institutions will have the benefits that accrue from using "portable" IPv6 address space, while TENET can rest assured that all assigned prefixes will aggregate completely within the "TENET" network.

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Implementation planning will be done together with interested institutions and Telkom.

### **Impact of recent “e-legislation”**

At several meetings of IT Directors of technikons and universities, concerns were expressed about the impact of recent “e-legislation” on the institutions. The Electronic Communications and Transactions Act, which legitimises electronic documents and transactions, has many ramifications for administrative processes. The Regulation of Interception of Communications Act, while outlawing the interception of communications generally, has numerous provisions that compel institutions to be in a position to intercept communications on their LANs if instructed to do so under a court order.

TENET decided to contract Buys Incorporated to produce advisory documents on these matters for distribution to all the institutions. Buys Incorporated is a legal firm that specialises in Internet, media and intellectual property law. TENET also arranged for the firm’s founder, Reinhardt Buys, to address the IT Directors at their meeting on 24 August 2002 in Durban.

Following the success of these actions, TENET further contracted Buys Inc to produce templates for key documents, including Proatia Manuals (also called PAIA Manuals), Intellectual Property Policy, Electronic Communications Policy, email disclaimers and Web-site terms and conditions. These templates have been circulated to the institutions, and they may use them, as is or suitably modified, free of charge.

Duncan H Martin  
*Chief Executive Officer*  
 26 May 2003

## **Extract from the Audited Financial Statements**

### **Income statement**

*for the period 1 January 2002 to 31 December 2002*

	Notes	Rand 2002	Rand 2001
<b>Revenue</b>	1	<b>2 901 366</b>	2 280 887
Operating costs		1 651 372	1 257 751
<b>Surplus from operations</b>	2	<b>1 249 994</b>	1 023 136
Interest received		403 809	4 978
<b>Net surplus for the period</b>		<b>1 653 803</b>	1 028 114
Accumulated surplus at the beginning		1 028 114	–
<b>Accumulated surplus at the end of period</b>		<b>2 681 917</b>	1 028 114

### **Balance sheet**

*as at 31 December 2002*

	Notes	Rand 2002	Rand 2001
<b>Assets</b>		<b>24 363 026</b>	21 768 430
<b>Fixed assets</b>		77 778	73 257
<b>Current assets</b>		<b>24 285 248</b>	21 695 173
Accounts receivable		100 722	257 478
Designated funds at bank	3	15 144 879	17 769 886
Current account	4	9 039 647	3 667 809
<b>Equity and liabilities</b>		<b>24 363 026</b>	21 768 430

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<b>Capital and reserves</b>		<b>17 826 796</b>	18 798 000
Designated funds		<b>15 144 879</b>	17 769 886
Accumulated surplus		<b>2 681 917</b>	1 028 114
<b>Current liabilities</b>		<b>6 536 230</b>	2 970 430
Accounts payable	<b>5</b>	<b>6 536 230</b>	2 970 430

### Cash flow statement

for the period 1 January 2002 to 31 December 2002

	Notes	Rand 2002	Rand 2001
<b>Cash inflows from operating activities</b>		<b>7 570 386</b>	21 526 791
Cash generated by operations	6	<b>7 166 577</b>	21 521 813
Interest received		<b>403 809</b>	4 978
<b>Cash flows from investing activities</b>		<b>(41 514)</b>	(89 096)
Proceeds from disposal of fixed assets		<b>-</b>	12 000
Acquisition of fixed assets		<b>(41 514)</b>	(101 096)
<b>Cash flows from financing activities</b>		<b>(4 782 041)</b>	-
Designated funds drawn down		<b>(4 782 041)</b>	-
<b>Net increase in cash and cash equivalents</b>		<b>2 746 831</b>	21 437 695
Cash and cash equivalents at beginning of period		<b>21 437 695</b>	-
<b>Cash and cash equivalents at end of period</b>	<b>4</b>	<b>24 184 526</b>	21 437 695

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Notes to the financial statements

for the period 1 January 2002 to 31 December 2002

	Rand 2002	Rand 2001
<b>1 Revenue</b>		
Agency fees	2 897 616	2 186 325
Donation	3 750	94 562
	<u>2 901 366</u>	<u>2 280 887</u>
<b>2 Surplus from operations:</b> takes into account		
Auditor' s remuneration		
Audit fee	10 796	6 840
Depreciation of fixed assets	36 993	13 785
Loss on disposal of fixed assets	-	2 054
<b>3 Designated funds</b>		
	<i>Designated funds represent donations and interest thereon received for and on behalf of public Higher Education Institutions in South Africa</i>	
Balance brought forward	17 769 886	-
Less grants drawn down	-3 773 954	-
Less project amount utilised	-1 008 087	-
Donations received	257 802	16 518 639
Interest received	1 899 232	1 251 247
	<u>15 144 879</u>	<u>17 769 886</u>
<b>4 Cash and cash equivalents</b>		
Net amount held as agent in current account	6 372 544	2 884 788
Balance brought forward on 1 January	2 884 788	-
Total received from institutions as payment for Telkom' s services	28 542 857	13 368 655
Less total paid to Telkom on behalf of institutions	-29 674 532	-10 483 867
Plus grants drawn down from designated funds	3 773 954	-
Plus DITCHE project amounts drawn down from designated funds	1 008 087	-
Less DITCHE project amounts paid over to NRF	-162 610	-
Own current account	2 667 103	783 021
Current account	9 039 647	3 667 809
Designated funds held in bank	15 144 879	17 769 886
	<u>24 184 526</u>	<u>21 437 695</u>
<b>5 Accounts payable</b>		
Included in accounts payable -		
Net amount held as agent in current account	6 372 544	2 884 788
Other creditors	163 686	85 642
	<u>6 536 230</u>	<u>2 970 430</u>
<b>6 Cash generated by operations</b>		
Operating income before interest	1 249 994	1 023 136
Adjustments for -		
- Depreciation of fixed assets	36 993	13 785
- Loss on disposal of fixed assets	-	2 054
Donations received	257 802	16 518 639
Interest received on donations	1 899 232	1 251 247
Operating income before working capital changes	3 444 021	18 808 861
(Increase)/decrease in accounts receivable	156 756	(257 478)
Increase/(decrease) in accounts payable	3 565 800	2 970 430
	<u>7 166 577</u>	<u>21 521 813</u>

**Contingent liability**

Provision has not been made for SA normal taxation as the company is in the process of applying for income tax exemption in terms of the Income Tax Act for Non-profit organisations. A contingent liability does however exist in the amount of R1 226 781 (2001: R659 896), which would be payable if the tax exemption is not obtained. The contingent taxation liability results from interest earned on donor funds and fee income generated.