

Annual Report

Covering the period 1 January 2005 – 31 December 2005

Foreword by the Chairperson

In the life of TENET, the highlights of 2005 were the implementation of the GEN2 agreement with TELKOM, gratifying evolution of TENET's capacity development programs, and the explosion of awareness and activity aimed at developing research and education networking in Africa on the part of the institutions, associations of universities, governments in Africa and abroad, international donors and existing research and education networks elsewhere in the world.

In retrospect, it is clear that the GEN2 agreement improved the affordability of Internet access for participating institutions, compared to its predecessor – the HEIST agreement. From a technical viewpoint, the migration to TELKOM's IPNet platform, which is more complicated and more expensive than the ATM VPCs platform used in the HEIST network, has yielded little by way of additional benefits for the institutions. For research and education institutions under present conditions in the South African telecommunications market, what is needed is simply far more bandwidth for about the same money!

The scope of TENET's programs for the development of IT capacity in Higher Education (DITCHE) expanded considerably in 2005. Major features included a joint workshop with Cisco Systems on Advanced Topics in Campus Networking; a Workshop on ICT issues in Libraries; a joint workshop with 6DISS on IPv6 and the annual National DITCHE Techie Event 2005. DITCHE has continued the collaboration with the International Network for the Availability of Scientific Publications (INASP) on the joint development of training materials in bandwidth management and optimisation.

TENET is most grateful to the Andrew W. Mellon Foundation for making two further generous grants to TENET during 2005. The first, a grant of USD 1.2 million, made it possible both to extend the DITCHE program through to 2010 and to include selected African countries within its target range. The second grant of USD 1 million, made at the end of 2005, permits the mounting of an entirely new program of fostering National Research and Education Networks in Africa (FRENIA). TENET has set aside R1.8 million from its own accumulated reserves for use by this program. The FRENIA program is about to be launched and will run over a five-year period.

Research and education networking in Africa received enormous publicity and attention during 2005, engendered largely through activities aimed at the World Summit on the Information Society (WSIS), which was held in Tunis in November 2005. Preparatory workshops and conferences were held in Johannesburg under the auspices of the Southern African Regional Universities Association (SARUA), and by major US donor foundations as adjuncts to Internet2 Member Meetings. A major Conference on Research and Education Networking in Africa was held in Tunis under the auspices of the Association of African Universities (AAU) and the Canadian International Development Research Centre (IDRC) as an adjunct to WSIS itself.

The major development that has crystallised from these activities is the formation of the UbuntuNet Alliance for Research and Education Networking. The Alliance is a non-profit, non-governmental membership-based association of African NRENs. It intends to evolve as a regional REN that will interconnect its member NRENs and provide them with inter-continental connectivity, in much the same way that Géant serves the NRENs of Europe. TENET is a founding member of the Alliance, together with KENET (Kenya), MAREN (Malawi), MoRENet (Mozambique) and RWEDNET (Rwanda). Membership is open to all bona fide NRENs in the target region.

TENET's Annual Report for 2004 mentioned that the SA Revenue Services was reviewing TENET's income tax status. I am pleased to be able to report that the review confirmed TENET's status as a Public Benefit Organisation and its concomitant exemption from income tax and certain other taxes. The determination is retro-active, and eliminates the contingent liability reflected in TENET's 2004 financial statements.

It is a pleasure to thank the Members, Directors, the CEO, Executive Officers and staff of TENET for their contributions to the company during the year under review.

Stuart J Saunders, *Chairperson*
24 July 2006

TERTIARY EDUCATION NETWORK

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 non-profit organisation in terms of the Nonprofit Organisations Act.

Company registration number: 2000/020780/08

Nonprofit organisation registration number: 014-801 NPO

VAT Registration Number: 4190191926

House Vincent, Wynberg Mews

10 Brodie Road

Wynberg 7800

Republic of South Africa

Purpose of the company

The main purpose of the company is to secure, for the benefit of South African higher education institutions and associated research and support institutions, Internet and information technology services. 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 Higher Education South Africa (HESA) as the legal successor of both the Committee of Technikon Principals and the SA Universities Vice-Chancellors Association, to nominate eight Members.

Members of TENET during the reporting period and into 2006 are listed in the following table.

Name	Appointment date	Retirement date
Balintulo, Prof M M	1 Mar 2002	15 Apr 2006
Bally, R	1 Mar 2002	
Du Pre, Prof R H	1 May 2006	
Kotze, D	1 May 2005	
Kotecha, Ms P	26 Jul 2000	15 Apr 2006
Lenyai, S K G	13 Mar 2003	
Malaza, Dr E D	1 May 2006	
Naicker, P N	1 Mar 2002	
Swartz, Prof D	15 Mar 2001	
Zingu, Prof E C	1 May 2005	

Directors

TENET's articles of association provide that there shall be between five and nine directors.

The directors who held office between 1 January 2005 and the date of this report are:

Name	Appointment date	Retirement date
Balintulo, Prof M M	20 Jan 2005	15 Apr 2006
Canham, Y	1 Jun 2002	
Du Pré, Prof R H	1 May 2006	
Kaniki, Prof A M	1 Jan 2002	
Kotecha, Ms P	22 Aug 2000	15 Apr 2006
Leatt, Dr J V (Deputy Chairperson)	22 Aug 2000	
Malaza, Dr E D	1 May 2006	
Martin, Dr D H	22 Aug 2000	
Nygren, T I (USA)	30 Aug 2000	
Saunders, Dr S J (Chairperson)	22 Aug 2000	
Shrock, H	1 Jan 2002	

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Officers

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

Executive Officer: Systems and Operations (until 31 May 2006): J Franz Dullaart.

Executive Officer: Capacity Development Programs: Duncan B Greaves.

Chief Technical Officer (from 1 March 2006): Andrew Alston

Technical Officer: Mariana Swart

Advisory Committee

As reported below, the Board appointed an Advisory Committee to advise and assist the CEO and the Board of TENET in assessing connectivity needs of the institutions; improving TENET's existing services; and conceiving, planning and mounting new services and projects. The names of those that served on the Advisory Committee during 2005 are given in the following table.

Name	
Yvette Canham (Chairperson)	University of Zululand
Franz Dullaart	TENET
Duncan Greaves	TENET
Rosalind Hattingh (until 31 March 2005)	SABINET
Chris Johl	Walter Sisulu University
Duncan Martin	TENET
Christopher Rajah (from 1 April 2005)	MRC
Vic Stipinovich	UNISA
Julian Thompson	Mangosuthu Technikon

Donors to higher education through TENET

TENET continues to manage 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 universities and for building greater capacity in the universities to develop and operate their campus networks.

The program of augmenting bandwidth purchases came to an end in 2004. This capacity building objective continues to be pursued through a TENET program called Development of IT Capacity in Higher Education (DITCHE).

TENET is most grateful to the Andrew W. Mellon Foundation for making two further generous grants to TENET during 2005. The first, a grant of USD 1.2 million, made it possible both to extend the DITCHE program through to 2010 and to include selected African countries within its target range. The second grant of USD 1 million, made at the end of 2005, permits the mounting of an entirely new program of fostering National Research and Education Networks in Africa (FRENIA). TENET has set aside R1.8 million from its own accumulated reserves for use by this program. The FRENIA program is about to be launched and will run over a five-year period.

Reports on these activities are included below.

Bankers

Commercial: Standard Bank of South Africa Limited

Investment: Nedbank Limited and Standard Bank of South Africa Limited

Auditor

KPMG Inc.

Attorney

Richard Rosenthal Attorneys

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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, and their sites to which Internet access services are provided, as at 31 December 2005.

Cape Higher Education Consortium CALICO Systems, Cape Town	SABINET (SA Bibliographic and Information Network) Main Campus, Pretoria
Cape Peninsula University of Technology Bellville Campus, Bellville District Six Campus, Cape Town	Tertiary Education Network Rouwkoop Road, Rondebosch Johannesburg Site, Johannesburg
Central University of Technology, Free State Kimberley Campus, Kimberley Kroonstad Campus, Kroonstad Main Campus, Bloemfontein	Tshwane University of Technology Arcadia Internet Laboratory, Pretoria Arts Campus Internet Laboratory, Pretoria I-Centre, Soshanguve South, Soshanguve Main Campus, Garankuwa, Garankuwa Main Campus, Soshanguve, Soshanguve Pretoria Campus, Pretoria e-Resource Centre B44, Pretoria e-Resource Centre B20, Pretoria Library, Pretoria Campus, Pretoria Nelspruit Campus, Nelspruit Nelspruit Campus Internet Laboratory, Nelspruit Polokwane Campus, Polokwane Polokwane Campus Internet Laboratory, Polokwane Witbank Campus, Witbank Witbank Campus Internet Laboratory, Witbank
Council on Higher Education Didacta Building, Pretoria	University of Cape Town Main Campus, Cape Town
CSIR Durban, Durban Biosciences, Johannesburg Natural Resources & the Environment, Johannesburg Data Centre, Johannesburg Port Elizabeth, Port Elizabeth Pretoria, Pretoria Satellite Applications Centre, Hartebeesthoek Stellenbosch, Stellenbosch	University of Fort Hare Bisho Campus, Bisho East London Campus, East London Alice Campus, Alice
Durban University of Technology Steve Biko Campus, Durban ML Sultan Campus, Durban Riverside Campus, Pietermaritzburg	University of Johannesburg Auckland Park Bunting, Johannesburg Doornfontein (DFC), Johannesburg Auckland Park, Johannesburg
Eastern Seaboard Association of Tertiary Institutions Central Applications Office, Durban	University of KwaZulu-Natal Durban Campus, Durban Pietermaritzburg Campus, Pietermaritzburg Premium service at Durban, Durban
Fort Cox College of Agriculture and Forestry Main Campus, King Williams Town	University of Limpopo Main Campus, Sovenga Medunsa, Medunsa
Higher Education South Africa Head Office, Pretoria	University of Pretoria Main Campus, Pretoria Medical Campus, Pretoria Onderstepoort Campus, Pretoria
Human Sciences Research Council Main Campus, Pretoria	University of South Africa Florida Campus, Johannesburg Main Campus, Pretoria
Iziko Museums of Cape Town SA Museum Main Campus, Cape Town	University of Stellenbosch African Institute for Mathematical Sciences, Muizenberg Main Campus, Stellenbosch
Mangosuthu Technikon Main Campus, Umlazi	University of Swaziland Main Campus, Manzini, Swaziland
Medical Research Council External Users Site, Bellville Main Campus, Bellville Africa Centre, Somkhele	University of the Free State Main Campus, Bloemfontein
National Library of South Africa Mangaung Library Services, Bloemfontein Cape Town, Cape Town Mzunduzi Municipal Library, Pietermaritzburg Pretoria, Pretoria	University of the Western Cape Main Campus, Bellville
National Research Foundation Astronomical Observatory, Observatory, Cape Town iThemba Laboratory for Accelerator Sciences, Faure Hartebeesthoek Radio Astronomy Obs, Hartebeesthoek Hermanus Magnetic Observatory, Hermanus Research Support Agency, Pretoria, Pretoria Schonland Research Centre, Johannesburg Sutherland Astronomical Observatory, Sutherland Pretoria National Zoological Gardens, Pretoria	University of the Witwatersrand Main Campus, Johannesburg
National University of Lesotho Main Campus, Roma 180, Lesotho	University of Venda Main Campus, Thohoyandou
Nelson Mandela Metropolitan University Computer Science Centre of Excellence, Port Elizabeth North Campus, Port Elizabeth South Campus, Port Elizabeth	University of Zululand Main Campus, kwaDlangezwa
North West University Mmabatho Campus, Mmabatho Potchefstroom Campus, Potchefstroom	Vaal University of Technology Main Campus, Vanderbijlpark
Rhodes University Gauteng Liaison Office, Johannesburg Main Campus, Grahamstown	Walter Sisulu University Butterworth Campus, Butterworth College Street Campus, East London Umtata Campus, Umtata
SA Agency for Science and Technology Advancement Main Campus, Pretoria	Water Research Commission Main Campus, Pretoria

CEO's Review of Operations

General Internet services to the institutions

Participating institutions

Throughout this review I refer to the post-merger institutions and use their post-merger names, where applicable¹. In some cases, merging institutions take longer to merge operationally and administratively than to merge in name. Consequently, though institutional names may change to reflect the merger, the component institutions may continue for many months to function as independent customers as regards order placing, billing and payments. TENET respects this and combines the component institutions into a single customer entity for administrative purposes only when explicitly instructed by the institution to do so.

During 2005 TENET was pleased to welcome CSIR and the Water Research Commission as participating institutions. Connections to the WRC campus and to eight CSIR sites were commissioned early in 2006.

On 31 March 2006, some 97 sites or campuses, including satellite campuses, of 40 institutions were connected to the Internet in this manner. The names of these institutions and their sites are listed above.

The agency model

TENET's power in negotiating service contracts with TELKOM and other suppliers derives from the willingness of each participating institution to appoint TENET as its sole agent for the procurement of Internet access. Each institution enters into an Agency Agreement with TENET, which authorises TENET to commit the institution to service contracts that fall within the service and time ambits delineated in the Agency Agreement. At the date of this report, these authorisations hold until 31 December 2007.

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.

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.

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; to 9% from 1 March 2003; to 8% from 1 March 2004, at which value it remained throughout 2005, and was further reduced to 7% from 1 March 2006.

Implementation of the GEN2 agreement

TENET signed its first agreement for the provision of Internet services to participating institutions in December 2000. This was the so-called Higher Education Inter-networking Solution with Telkom, or "HEIST agreement". As is described in TENET's 2004 Annual report, during 2004, TENET and TELKOM negotiated a new contract, called the "Second Generation" or "GEN2" contract, which superseded the HEIST agreement from 1 January 2005. The GEN2 agreement provided for

¹ In 2002 the Minister of Education mandated a number of mergers between universities and technikons.

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TELKOM to migrate the service platform from one based upon PVCs² within TELKOM's ATM network to one that utilises VPNs³ within TELKOM's MPLS⁴-enabled IPNet platform.

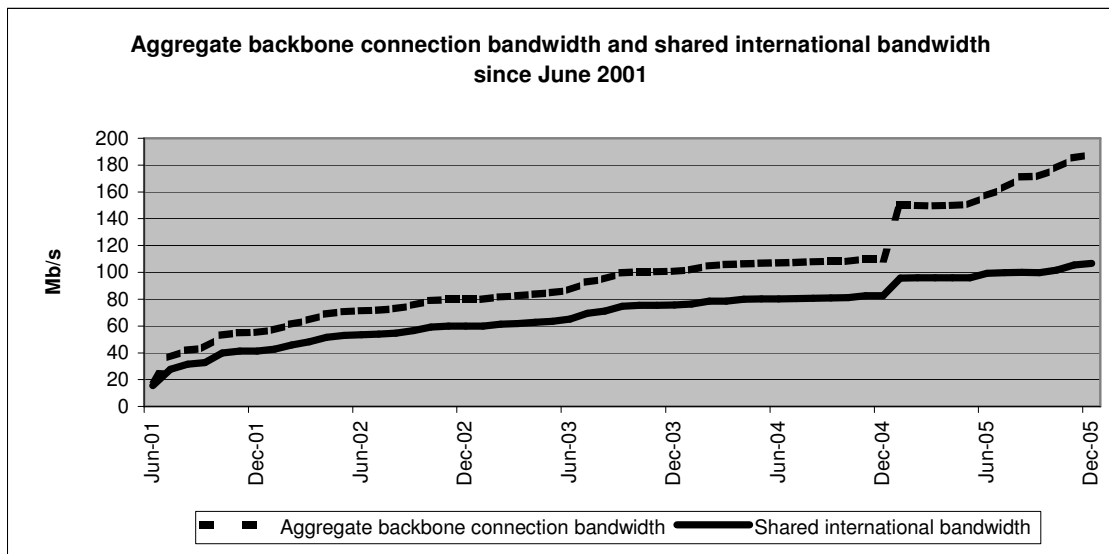
The GEN2 contract also included an improved services structure, in which the capacity (bandwidth) of each site's connection to a local TELKOM exchange is a separately specifiable order-quantity, together with the international and national bandwidths, instead of being calculated from a formula involving the international, national and "within-TENET" bandwidths. This enabled sites to increase their backbone connection bandwidth without having to change their (much more expensive) international bandwidth. The associated charge structure attaches part of the cost of the backbone network to the international and national bandwidth charges and part to the backbone connection charge.

TELKOM's implementation of the GEN2 agreement during 2005 entailed considerable re-engineering of the backbone network. Whereas the HEIST platform used private virtual circuits within TELKOM's ATM network as the building blocks of the network, TELKOM configured the GEN2 network entirely within its MPLS-enabled and QoS-enabled IPNet network. This necessitated the introduction of "stacker" routers at the international and national gateways as the means of limiting international and national traffic to the ordered bandwidths on a per-site basis.

The last sites were cut over to the new platform in August 2005, and the platform has proved to be stable. Gert Eybers of TELKOM led the implementation project, and TENET was fortunate in being able to secure the services of Mike Lawrie, to control the transition, site by site, from TENET's side. These gentlemen, together with TELKOM's Service Manager, Mr Ernst Visagie and Network Engineer, Mr Arrie Bezuidenhout, and TENET's Franz Dullaart, were key players in ensuring that the transition was effected smoothly and with minimal service disruption.

Growth in bandwidth order quantities

The dotted line graph in the chart below shows the aggregate bandwidth of the physical connections of the sites to the TELKOM network. The continuous line graph shows the magnitude of the shared international bandwidth that is available to the sites jointly. Until May 2003 TELKOM provided this shared international connectivity using satellite circuits. Since that time it has been provided using the SAT-3 submarine cable. The sites share this bandwidth, with the peak inbound traffic flow to each site being restricted at the South African landing point.



² Permanent Virtual Circuits

³ Virtual Private Networks

⁴ Multi-Protocol Label Switching

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The graphs show the steady increase during the “HEIST years” through to December 2004 that has been reported in previous annual reports.

The extraordinary jumps in both graphs in January 2005⁵ is due to the considerable net price decrease that TELKOM offered as part of the GEN2 agreement. From its side, TENET agreed that the benefit of the price decrease would not be taken in reduced payments but in increased bandwidth. The agreement also allowed TELKOM to provide the increased bandwidth immediately by upgrading the HEIST network, on a site-by-site basis, without waiting for the site to be migrated to the GEN2 platform. This arrangement benefited many sites and produced the extraordinary bandwidth jumps. However there were also many sites for which such upgrades were not possible and which had to wait for TELKOM to migrate them to the IPNet platform before they could benefit in bandwidth terms from the lower unit prices. Such sites did, of course, benefit from reduced charges while they waited for their migration orders to be commissioned.

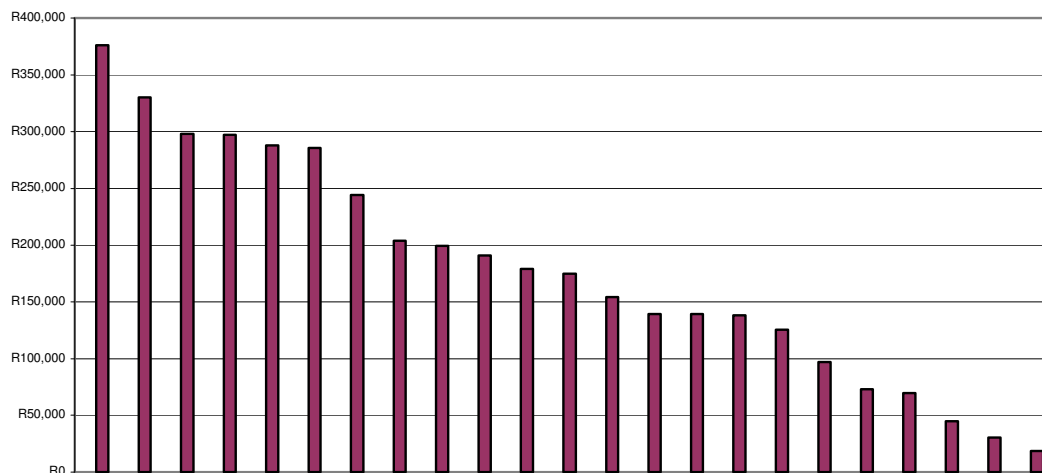
The 2005 portion of the graphs also shows that institutions took advantage of the revised service structure, as described above, to increase the backbone connection bandwidth so as to better avoid congestion.

Bandwidth distribution among participating universities

While the 23 participating South African universities and universities of technology comprise only two thirds of the participating institutions, they use some 90% of the total service capacity. The inter-institutional comparison in this section is limited to the universities (including the universities of technology) because they share the need to meet the demand from large numbers of students for effective Internet access.

Within the group of 23 South African higher education institutions there are still large differences in the rand value of Internet access services that they purchase. Each bar on the following chart represents one of these institutions, and the height of the bar represents the charge to the institution for GEN2 services during December 2005.

GEN2 service charges to HE institutions during December 2005



The seven tallest bars are the Universities of Cape Town, Kwa Zulu-Natal, Stellenbosch, Johannesburg, Tshwane University of Technology, the Universities of the Witwatersrand and Pretoria, in that order. These seven tallest bars together account for more than 51% of the total charges. The median charge is R 174,616 per month, up from R138,950 in December 2004, R 67,469 in December 2003 and R 51,750 in December 2002.

⁵ The aggregate backbone connection bandwidth and the shared international bandwidth jumped from 110 Mb/s and 83 Mb/s respectively in December 2004 to 150 Mb/s and 96 Mb/s respectively in January 2005.

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Growth in aggregate charges

A characteristic feature of Internet use by education and research institutions in countries is the proportion of traffic that flows into their networks from the USA, Europe and other foreign 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 around 80% of the cost to institutions is associated with the International service.

The following table shows the charge breakdown by service, totalled across all sites, for the four years through to and including 2005.

Year	International	National	Intra-TENET	Backbone connection	Total	Year-on-year
	<i>Rand</i>	<i>Rand</i>	<i>Rand</i>	<i>Rand</i>	<i>Rand</i>	
2005	32,567,462	4,218,066	-	12,811,659	49,597,187	6.1%
2004	38,867,055	5,798,632	2,063,114	-	46,728,801	25.2%
2003	30,266,784	4,941,920	2,103,641	-	37,312,345	32.3%
2002	22,352,651	3,995,852	1,860,365	-	28,208,868	

The table reflects the changed services and charge structure of the GEN2 agreement. Until and including 2004, under the HEIST agreement, the full charge for carrying international traffic to and from a site was included in the international charge; and similarly for national traffic and intra-TENET traffic. In the GEN2 model, all three of these services share the backbone connection bandwidth, the charge for which is made separately.

The much lower growth in total expenditure also calls for comment. This is partly due to the fact that the implementation of the GEN2 service architecture required every site to be migrated from the previous, ATM-based platform to the new IPNet platform, as mentioned above. This required considerable time and effort, and, as mentioned in the previous section, some sites remained unmigrated for many months. Such sites received the benefit of the lower GEN2 unit prices in the form of reduced monthly charges rather than as additional bandwidth. This factor reduced the total value of TELKOM's invoices for 2006, which grew by only 6.1% over its value in 2004, as reflected in the table. This explanation is supported by a comparison of the total value of service charges for the months of December 2004 and December 2005. These were R4,216,076.24 and R4,775,664.77 respectively - a growth of 13.2% over the year.

Last overall comments on the GEN2 agreement

In retrospect, it is clear that the GEN2 agreement produced a very significant improvement in the affordability of Internet access for participating institutions, compared to its predecessor – the HEIST agreement. TENET is grateful to the TELKOM team, which is led by Mr Godfrey Ntoele, Managing Executive, for this improvement. The improvement derived from a significant decrease in the unit charge for international connectivity, which decrease outweighed increased unit charges for IPNet connectivity within South Africa and for peering with other South African ISPs.

From a technical viewpoint, the migration to TELKOM's IPNet platform, which is more complicated and more expensive than the ATM VPCs platform used in the HEIST network, has yielded little by way of additional benefits for the institutions. In particular, there has been no demand from the institutions for higher Quality of Service connections that offer priority routing at a somewhat higher unit price. A further downside, which was not anticipated, is that TELKOM requires 60 days to implement almost all bandwidth upgrade orders, which was not the case for the simpler ATM network.

The problem of exorbitant cross-border half-circuit tariffs

The University of Swaziland and the National University of Lesotho have participated with the South African universities and research institutions in collaborative networking for many years – starting in the (pre-TENET) UNINET era. Both of these universities purchase general Internet access in terms of the GEN2 agreement. TELKOM charges them according to the agreed GEN2 prices as though they

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were located in South Africa. However, unlike their South African counterparts, each of them has to purchase a circuit that extends their backbone connection from a TELKOM exchange in South Africa, across the border and to its campus. Such cross-border circuits are not covered by the GEN2 agreement, and comprise two so-called “half-circuits” – one purchased from TELKOM SA and the other from their own national operator.

During 2005, TENET became aware that each month, the two 192 kb/s half-circuits used by the University of Swaziland were costing the University almost twice as much as the entire GEN2 monthly service charge. TENET approached TELKOM SA to see what could be done to reduce these seemingly excessive charges. TELKOM SA said that the charges were set according to an agreement between the two companies, and very readily offered to match any reduction that the Swaziland Post and Telegraph Company (SPTC) offered.

In view of this offer from TELKOM SA, the Vice-Chancellor of the University, Prof Cisco Magagula, arranged a high-level meeting with SPTC, and invited TENET to attend. However SPTC declined to consider any reduction in its half-circuit charge, and stated that it would itself provide Internet access to the University. This has not happened, and, at the time of writing (June 2006) the University has been trying for some months to get SPTC and TELKOM SA to upgrade the half-circuits to 320 kb/s.

Stimulation and support of IPv6

TENET’s efforts to stimulate and support learning about and experimentation with the next generation Internet protocol suite IPv6 were given a tremendous burst through the initiative and energy of Andrew Alston, a Network Engineer in Information and Communications Technology Services at the University of Cape Town.

Realising that TENET was ideally placed to operate an inter-institutional IPv6 tunnel broker, Mr Alston approached TENET and offered to set up such a system. With the approval of the University, TENET appointed Mr Alston as a part-time, after-hours Technical Officer from 1 August 2005⁶. Within a very short time he had set up an effective tunnel broker, and had established peering and transit connections with major IPv6 networks in Europe and the USA.

The tunnel broker enables participating institutions to establish IPv6 connections between each other and with hosts on IPv6 networks worldwide. The IPv6 packets are carried via the broker through “tunnels” configured within the established IPv4 network. This enables staff and students at the institutions to experiment with and gain real experience with IPv6 networking, even though the TENET network, which is configured within the standard IPv4 networks of TELKOM and its upstream providers, is not yet able to support IPv6 natively.

The European Commission is very actively encouraging research and education networks in Europe and elsewhere to engage with and promote the adoption of IPv6. Mr Alston soon established tunnels to the EC’s Géant network’s point-of-presence in London and Internet2’s point of presence in New York City. The latter uses the (IPv4) GRE tunnel described below.

Two further tunnelled connections run between the TENET IPv6 tunnel broker and points of presence of the OCCAID network in London and in Ashburn, Virginia, USA. OCCAID (<http://www.occaid.org>) is a collaborative association between research communities and ISPs, based in the USA but expanding steadily into Europe and other regions of the World. OCCAID works to deploy next generation network technologies for enrichment of commercial and advanced Internet applications, and operates a major nation-wide IPv6 research network in the USA. OCCAID and TENET decided to join forces in a strategic partnership for the development of IPv6 resources in the tertiary education and research sectors in South Africa, in line with OCCAID’s commitment to provide service to all NREN’s within the AfriNIC zone. OCCAID initially granted peering status to TENET, and this was later upgraded to complete transit status.

Mr Alston also established tunnelled IPv6 connections with RealRoot in Brussels and London.

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

⁶ Mr Alston subsequently joined TENET full-time, from 1 March 2006, as Chief Technical Officer.

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domiciled in South Africa. Since the advent of the za Domain Name Authority (zaDNA) in 2002, TENET has been responsible to zaDNA in this regard.

TENET is grateful to the University of Cape Town for having hosted the primary name server (disa.tenet.ac.za) for AC.ZA for many years. As a result of major refurbishment within UCT's computer rooms, TENET decided to terminate its server network at UCT, and re-located it during July 2005 at TENET's own premises at 46 Rouwkoop Road. This was seen as a temporary home, pending commissioning of the long-awaited Beachhead Facility⁷.

AfriNIC and TENET's role as Local Internet Registry

In April 2005, the newly formed African Network Information Centre, AfriNIC, assumed responsibility to serve Africa and the Indian Ocean Regions as a Regional Internet Registry (RIR) as regards Internet number resources. Prior to that this responsibility had been exercised by the American Registry for Internet Numbers (ARIN) in respect of large regions of sub-Saharan Africa, including South Africa, the Réseaux IP Européens - Network Coordination Centre (RIPE NCC) in respect of most countries of North and West Africa, and the Asia Pacific and Indian Ocean Network Information Centre (APNIC) in respect of certain countries of the region.

AfriNIC is a non-governmental, not-for-profit, membership-based organization. AfriNIC's head office is in Ebene Cyber City, Mauritius and its operations centre is in Randburg, South Africa.

In 2000, TENET inherited the role of being a Local Internet Registry from the UNINET Project of the National Research Foundation. In this capacity, TENET was responsible to ARIN for the top-level administration of quite vast tracts of Internet address space which were originally allocated by the then Internic to the UNINET Project, and from which assignments, mostly small ones, had been made over the years to organisations throughout South Africa without regard to the type of organisation, locality or aggregatability of routes, as was the current practice at the time.

Following the advent of AfriNIC, and with AfriNIC's full agreement, TENET decided to relinquish responsibility for six major blocks of Internet address space for which TENET had no business relationship with the great majority of assignees and had no value to add through being the responsible Local Internet Registry.

The six blocks of IPv4 address space involved were the following:

192.96.0.0/16; 196.6.0.0/16; 196.10.0.0/16; 196.11.0.0/16; 196.13.0.0/16 and 198.54.0.0/16.

AfriNIC assumed responsibility for these blocks and updated its whois database accordingly. No assignments from these blocks to any end user organisation were affected by the change. In particular, AfriNIC acknowledged and respects the portability of such assignments.

TENET remains the Local Internet Registry that is accountable to AfriNIC and responsible for the blocks 196.21.0.0/16, 196.24.0.0/16 and 155.232.0.0/16 of IPv4 address space. Assignments from these blocks are not portable in the hands of assignee organisations, as route announcements to all addresses in these blocks are aggregated within TENET's formal autonomous systems.

TENET is also a Local Internet Registry, responsible to AfriNIC, for IPv6 assignments to institutions that use the TENET network. Following AfriNIC's assumption of RIR responsibilities for the region, ARIN's previously announced, original allocation of the prefix 2001:0548::/32 to TENET was withdrawn and replaced by 2001:4200::/32, which falls within the overall IANA allocation to AfriNIC.

TENET's REN Activities

RENs, NREns and regional RENs

Over the past six or seven years, faced with the increasingly congested state of their institutions' general Internet access connections, universities and research laboratories in many countries collaborated to establish separate networks that use Internet protocols but are "private" in the sense that they carry only traffic that is passing between member institutions, and do not provide

⁷ The Beachhead Facility was commissioned in May 2006 within TELKOM's Bellville Hosting Facility, and disa is now located there.

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connectivity to the Internet at large. These networks have come to be called “RENS” (Research and Education Networks).

A useful way to think of RENS is to see them as providing faster, better *routes* for network traffic between member institutions than the routes provided by the institutions’ general Internet connectivity arrangements.

Many RENS are created with a national scope, in that their member institutions are all the universities and research institutions within a given country. Such RENS are referred to widely as “National Research and Education Networks”, or NRENS. Examples of NRENS are the Joint Academic Network (JANET) in the UK, SURFNet in The Netherlands, NorduNet in Scandinavia, the Australian Academic Network (AARNET) in Australia, the Kenya Education Network (KENET) in Kenya and SINET in Japan.

In the USA there are several NRENS with a coast-to-coast, country-wide scope, including Abilene (operated by Internet2, a consortium of universities), the Energy Sciences network ESNNet, and National LambdaRail (also an association of universities). There are also many RENS in the USA with state-wide scope, such as the Corporation for Educational Network Initiatives in California (GENIC) and the New York State Education and Research Network (NYSERNet).

For South Africa, the TENET network functions as, and is widely recognised, both within the country and in the REN community at large, as the South African NREN.

The European Commission’s famous Géant network is the world’s most extensive regional REN. It interconnects the 35 NRENS in Europe at very high speeds and provides high-speed connections to national and regional RENS elsewhere in the world. Géant is deployed and operated under contract to the Commission by the non-profit company DANTE (Delivery of Advanced Networking Technology to Europe), which is located in Cambridge, United Kingdom. DANTE plc is owned by a group of European NRENS.

The Géant connection

As reported in the 2004 Annual report, TENET’s connection to Géant network was established in October 2004. Physically, it comprises a high-speed link within Telecity, London, between the Géant point of presence and TELKOM’s Internet node there. TENET has no dedicated link between London and South Africa – on the SAT-3 submarine cable link, traffic to and from Géant mingles with other traffic to and from the TENET network, which in turn mingles with traffic to and from TELKOM SA’s other customers. A tunnelling protocol is used between the Géant router in London and the TENET International Gateway router in Cape Town to ensure that route announcements between TENET and Géant are not available to other networks that use TELKOM’s Internet access services.

Géant provides TENET with a full transit service to other RENS worldwide with which it has interconnections. TENET is grateful to the operations staff of DANTE and TELKOM SA, who together ensured that the Géant tunnel operated without interruption throughout 2005.

REN traffic comprises a relatively small proportion of total traffic. This is testimony to the disabling effect of severely limited bandwidth on researchers’ willingness to undertake data intensive research projects that require frequent transfer of large datasets to or from international sources. Institutions’ Internet access circuits are more congested than ever before, and REN traffic still competes with commodity traffic on these congested circuits. The institutions’ backbone connection circuits, despite significant increases in bandwidth, and despite an annualised cost to the institutions of almost R60 million, are completely inadequate to meet the demand, let alone to enable modern e-research activities.

TENET is grateful for its excellent working relationships with the officials of the EC who are responsible for developing Géant and its global connectivity. I attended the Géant2 Launch in June 2005 in Luxembourg, and presented an invited paper on the challenges of connectivity between Europe and South Africa. As TENET’s CEO, I participated in an EC Workshop on regional connectivity held as part of the World Summit on the Information Society (WSIS) in November 2005 in Tunis.

Direct connection with Abilene

Internet2 and TENET opened discussions about a cooperative agreement at the 2005 Internet2 Spring Member meeting in May 2005 in Washington, DC. On 18 September 2005, at the Internet2

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Fall Member Meeting in Philadelphia, Mr Doug Van Houweling, President of Internet2, and I signed a formal Memorandum of Understanding (MoU). In particular, Internet2 and TENET agreed to establish a direct connection between Internet2's Abilene network and the TENET network. Internet2's Manhattan Landing Facility (MANLAN) in New York City (NYC) was agreed as the place at which the connection would be made.

Realising this connection in NYC was far more difficult than had been the case with the Géant connection in London, mainly because TELKOM's point-of-presence in NYC is located in a so-called "carrier hotel" at 111 8th Avenue, which is some five miles distant from MANLAN's location at 32 Avenue of the Americas.

Fortunately, the New York State Education and Research Network, NYSERNet, was in a position to assist with the procurement and operation of the required optical fibre link. Using Level3 Communications as a sub-contractor, NYSERNet now provides TENET with a passive optical path between specified demarcations at the two locations. This is done in terms of a Dark Fibre Service Agreement between TENET and NYSERNet. TENET also signed a formal MANLAN Participation Agreement and an Abilene Connection Agreement with Internet2. Finally, an addendum to the GEN2 agreement had to be negotiated with TELKOM SA concerning the deployment and operation, by TELKOM's upstream provider, Global Crossing Inc, of the required internal cabling at 111 8th Avenue. TELKOM also undertook to operate the Cape Town end of the GRE tunnel between the Abilene and TENET networks.

TENET is most grateful to Steve Cotter, Heather Boyles and Ana Preston of Internet2, Bill Owens, Jeff Harrington and Sharon Akkoul of NYSERNet, and Roland Vrijheid of Global Crossing for their assistance and forbearance in bringing the agreements to a conclusion and in getting them implemented. Implementation was completed only in April 2006. Working with Caroline Carver Weilhamer of the Abilene Network Operations Centre, TENET's Andrew Alston and TELKOM's Pawel Dabrowski played major roles in the intricate matter of persuading routers from disparate vendors and separated by many thousands of kilometres to talk tunnel turkey to each other.

With regard to the GEN2 addendum, TENET is extremely grateful to Mr Troy Hector, the TELKOM Executive who handled this most unusual set of demands with grace and efficiency. Apart from this TELKOM played no role in the negotiations, and bears no responsibility for the dark fibre connectivity in NYC or the physical connection at MANLAN.

Traffic between TENET and the NRENs of North America now traverses the direct connection with Abilene, while traffic from European NRENs and NRENs of the Far East traverses the Géant connection. TENET is exploring the possibility of direct connections with Far Eastern and Australasian NRENs in Singapore.

The Department of Science and Technology's SANReN

Throughout most of 2005 TENET assisted the Department of Science and Technology (DST) with the conceptualisations and high-level design of the DST's proposed South African Research network (SANReN). TENET did so without charging for its own services⁸, in the belief and hope that the DST would see fit to implement the proposed SANReN as an extension to and upgrading of the TENET network.

In March 2006, the DST decided instead that SANReN would be deployed as an entirely separate network; that it would provide inter-connectivity between selected sites; that it would provide connectivity to Géant but not to the Internet generally; and that the Meraka Institute, which is a unit within the CSIR, would be responsible for implementing SANReN as a project on behalf of the DST. In informing TENET of this decision, the then Acting Director-General said that SANReN would not attempt to meet the connectivity requirements of the universities as institutions. Its purpose would be to provide infrastructural support needed for strategic research interventions by Government.

The decision to build a separate network rather than to extend and strengthen the existing TENET network means that while certain sites and research projects will benefit from low cost, high speed connectivity to certain other sites and to Géant, a comprehensive research and education networking service that attempts to meet the broad connectivity needs of all the universities and research institutions generally, will continue to be without direct Government support. It also encumbers every

⁸ Travel costs, fees charged by external consultants and other incidental costs were recovered from the DST.

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institution with the need to manage connections and routing arrangements with two networks, and confronts the NRENs of the world with the dilemma of potentially having to interconnect with both SANReN and TENET.

TENET has drawn the situation to the attention of Higher Education South Africa (HESA), to the Departments of Education and Science and Technology, and the parties are collaborating to find a satisfactory solution.

The UbuntuNet Alliance

The UbuntuNet Alliance is an association whose mission is to deploy and operate a regional REN for sub-Saharan Africa. The UbuntuNet network will start with a focus on areas of eastern and southern Africa where the prospect of optical fibre connectivity is greatest. Eventually UbuntuNet will interconnect NRENs in the region, from the Sudan and Somalia in the North to Mozambique and South Africa in the South, and will provide shared, high-speed connections to Géant and to the global REN generally.

The NRENs of Kenya (KENET), Malawi (MAREN), Mozambique (MoRENet), Rwanda (RWEDNET) and South Africa (TENET) are the joint founders of the UbuntuNet Alliance. The UbuntuNet initiative engendered a flurry of national initiatives by universities and research institutions throughout the region to form NRENs. Strong expressions of interest and intention to form NRENs and join the UbuntuNet Alliance have been received from Botswana, the Democratic Republic of Congo, Namibia, Sudan, Tanzania, Uganda and Zambia.

The UbuntuNet Alliance will shortly be incorporated as a non-profit, non-governmental association in the Netherlands. Subsidiaries will be established in countries of the region as and when operational needs require this – for example to secure the necessary telecommunications licenses. This will enable it to receive donations and enter into contracts in pursuit of its objectives internationally. Its Articles of Association will ensure that it functions as an independent, non-governmental, non-profit organisation, limited by guarantee and controlled collectively by representatives appointed by its member NRENs.

The UbuntuNet initiative was announced at the 2005 World Summit on the Information Society in Tunis. It has received active support from the e-Africa Commission, the Association of African Universities (AAU), the Southern African Regional Universities Association (SARUA), the European Commission and the World Bank Institute, and from major donors such as IDRC (Canada), BMZ (Germany), the Open Society Institute (OSI) and SIDA (Sweden).

Compared to the countries of East Africa, South Africa is fortunate in already having substantial optical fibre infrastructure and connectivity via the SAT-3 submarine cable to Europe and the Far East. To date, however, the benefit has been limited by two main hurdles:

- the very high charges for inter-continental connectivity via the SAT-3 cable; and
- the exorbitant prices generally charged by telcos in the region for cross-border connectivity, as illustrated in Section 2.8 in the case of University of Swaziland.

In this regard, collaborative action through the UbuntuNet Alliance represents the best hope for South African universities and research institutions to achieve access to high-speed international connectivity within the region and to the rest of the world, at affordable prices. It is vitally important that the universities and research institutions should have the support of the South African Government in their participation, through TENET as their appointed agent, in the UbuntuNet Alliance and its projects.

Capacity Development Programs

The scope of TENET's capacity development programs expanded considerably in 2005.

Generous grants from the donor foundations comprising the Partnership for Higher Education in Africa (the Ford Foundation, the Carnegie Corporation of New York, the Rockefeller Foundation and the MacArthur Foundation) underpinned a new and tightly focussed program on bandwidth management and optimisation training for thirteen institutions of higher education in Africa.

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A generous grant from the Andrew W. Mellon Foundation of USD 1.2 million made it possible both to extend the DITCHE program through to 2010 and to include selected African countries within its target range.

A second grant from the Andrew W Mellon Foundation at the end of 2005 of USD 1 million permitted the mounting of an entirely new program of fostering National Research and Education Networks in Africa (FRENIA). This program will get underway in 2006. When applying for this grant, TENET undertook, if the application was successful, to set aside \$ 300,000 of its own reserves for the FRENIA program. To this end, TENET transferred R1.8 million from its accumulated reserves to the Donors Designated Fund, as is reflected in the balance sheet at 31 December 2005.

Major features of DITCHE's 2005 activities were as follows:

Joint workshop with Cisco Systems on Advanced Topics in Campus Networking: This was held at Cisco's offices in Johannesburg in April. Cisco provided the speakers, some of whom flew in from Europe just for the workshop. Topics covered included security issues, network convergence, wireless networking, and IPv6.

Workshop on ICT issues in Libraries: This was held at NMMU in May and was intended primarily for staff in libraries who have professional responsibility for the deployment and maintenance of IT systems. The event was a notable success and was distinguished by a high level of contributions from the floor as well as an unusually large number of offers for presentations by delegates. This workshop will be repeated as an annual event on the DITCHE calendar.

Joint workshop with 6DISS on IPv6: This was also held at NMMU, in September. 6DISS is a European Commission entity for the dissemination of knowledge about the IPv6 protocol. Three experts from NRENs in Europe presented the material and there has been, in the wake of the workshop, a general swell of interest in IPv6 among TENET's member institutions.

National DITCHE Techie Event 2005: This was held immediately after the 6DISS workshop. The format was changed from previous years to include a separate day of technical workshops (on TCP/IP, on packet filtering with Ethereal, and on deploying VPNs across the GEN2 network.) A change was also made to the format of the main event, in that all delegates were obliged, in principle, to offer a presentation of some sort; however, the conference style of previous events was abandoned in favour of a workshop format, so that presentations did not require the same rigour as in previous years. A notable feature of the new format was that a large number of black staff for the first time delivered presentations.

The National Techie Event has now grown in popularity to the degree that it will be split in future years into an event specifically for end-user practitioners, and a colloquium on networking.

Technical resources project: Requests for books continued to run at a slow but steady rate. The Safari online subscription was renewed in June 2005; the number of Safari users is relatively small (about 40) but reports indicate that the service is exceptionally useful.

Workshop on XML and XSLT: This was trialed with Calico users in October 2005, with a view to offering it nationally – primarily for library IT staff – in 2006.

Support to the National Telephony User Group (NTUG): DITCHE has sought closer relations with NTUG, on the simple grounds that centripetal forces in the IT world are driving telephony and data closer together, a fact that is recognised equally by NTUG itself. In September NTUG mounted a conference on the impact of mergers on telephony in higher education with DITCHE funding.

Collaboration with INASP: DITCHE has continued the collaboration with the International Network for the Availability of Scientific Publications (INASP) that was begun in 2004. The aim of the collaboration has been the joint development of training materials in bandwidth management and optimisation. Joint development of a workshop in the uses and limits of policy-based bandwidth management was trialed in Lusaka in October. Further collaboration in supporting open-source tools for bandwidth management is planned for the future.

TENET records its gratitude to the many staff from public higher education institutions who contributed to DITCHE events and workshops in the 2005 program.

TENET Advisory Committee

TENET's Advisory Committee comprises five IT Directors of participating institutions, plus TENET's management staff. Ms Yvette Canham, in her capacity as the Director of TENET that is charged with the special responsibility of representing the interests of the IT Directors of participating institutions, chairs the Advisory Committee. The other four IT Directors on the Committee during 2005 were Christopher Rajah of the Medical Research Council, Chris Johl of the Walter Sisulu University, Vic Stipinovich of UNISA and Julian Thompson of Mangosuthu Technikon.

The Advisory Committee met twice during 2005. TENET is grateful for the many inputs and insights derived from these meetings.

Confirmation of TENET's tax-exempt status

TENET's 2004 financial statements included a contingent liability in respect of possible income taxes payable, in the amount of R 1 954 995, pending the outcome of an investigation by the SA Revenue Service (SARS) as to the legitimacy of TENET's credentials as a Public Benefit Organisation.

Subsequently TENET received written confirmation from SARS that TENET does indeed meet the requirements to be classified as a Public Benefit Organisation and consequently, qualifies for exemption from income tax. The determination is retroactive, and consequently TENET has no actual or contingent tax liabilities at all.

TENET is deeply grateful to Mr Richard Rosenthal, Attorney, who has handled this protracted challenge and without whose insight and knowledge TENET might well have failed to convince SARS of the veracity of its case.

SARS also ruled, and TENET did not object, that TENET no longer enjoys Section 18A exemption status. This reflects the fact that many of TENET's institutions are primarily research institutions rather than being primarily educational institutions.

In conclusion

It is a pleasure to thank all those people who have contributed in a sustained way to the activities and results reviewed in this report. The Members and Directors of TENET, and members of the Advisory Committee have given freely of their time and wisdom at the AGM and at Board and Advisory Committee meetings.

The Chairman, Dr S J Saunders, and Deputy Chairman, Dr J V Leatt, have participated in Executive Committee meetings and taken special initiatives on several occasions to help TENET to achieve its objectives.

It was and is a pleasure to work with TENET's officers: Andrew Alston, Franz Dullaart, Duncan Greaves and Mariana Swart.

TENET values its working relationship with the Cape Higher Education Consortium, with which it shares office accommodation and from which it buys a bouquet of administrative support services.

Finally, the excellent working relationship between TENET and Telkom is, in great measure, due to the diligence and insight of Telkom's Customer Account Manager, Cornel Bezuidenhout.

Duncan H Martin

Chief Executive Officer

23 July 2006

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Extract from the Audited Financial Statements

Income statement

for the period 1 January 2005 to 31 December 2005

	Notes	Rand 2005	Rand 2004
Revenue	<i>1</i>	4 228 226	3 622 180
Operating costs		3 636 013	2 725 255
Surplus from operations	<i>2</i>	592 213	896 925
Interest received		562 565	528 339
Net surplus for the period		1 154 778	1 425 264
Accumulated surplus at the beginning		5 077 901	3 652 637
Less transfer to Donors designated Fund	<i>7</i>	1 800 000	-
Accumulated surplus at the end of period		4 432 679	5 077 901

Balance sheet

as at 31 December 2005

	Notes	Rand 2005	Rand 2004
Assets		33 528 726	22 338 160
Fixed assets		989 797	1 445 599
Current assets		32 538 929	20 892 561
Accounts receivable		209 187	373 046
Designated funds at bank	<i>3</i>	15 329 599	7 359 972
Current account	<i>4</i>	17 000 143	13 159 543
Equity and liabilities		33 528 726	22 338 160
Capital and reserves		19 762 278	12 437 873
Designated funds		15 329 599	7 359 972
Accumulated surplus		4 432 679	5 077 901
Current liabilities		13 766 448	9 900 287
Accounts payable	<i>5</i>	10 681 246	9 900 287
Held in trust for DST (SANReN)	<i>8</i>	3 085 202	-

Cash flow statement

for the period 1 January 2005 to 31 December 2005

	Notes	Rand 2005	Rand 2004
Cash inflows (outflows) from operating activities	<i>6</i>	6 475 770	8 293 520
Cash generated by operations		5 913 205	7 765 181
Interest received		562 565	528 339
Cash flows from investing activities		(36 857)	(1 484 609)
Acquisition of fixed assets		(36 857)	(1 484 609)
Cash flows from financing activities		5 371 314	(3 111 108)
Designated funds: donations received		8 218 222	-
Designated funds drawn down		(2 846 908)	(3 111 108)
Net increase in cash and cash equivalents		11 810 227	3 697 803
Cash and cash equivalents at beginning of period		20 519 515	16 821 712
Cash and cash equivalents at end of period	<i>4</i>	32 329 742	20 519 515

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Notes to the financial statements

	Rand 2005	Rand 2004
1 Revenue		
Cost recoveries: agency fees	3 989 148	3 537 206
Other cost recoveries	239 078	84 974
	4 228 226	3 622 180
2 Surplus from operations: takes into account		
Audit fee	22 975	15 550
Depreciation of fixed assets	492 659	102 213
3 Designated funds		
<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	7 359 972	9 854 160
Less grants drawn down	(2 846 908)	(3 111 108)
Less project amount utilised	-	(556 910)
Donations received	8 218 222	-
Transferred from reserve for FRENIA program	1 800 000	
Interest received	798 313	608 446
	15 329 599	7 359 972
4 Cash and cash equivalents		
Net amount held as agent in current account	10 205 401	9 783 287
<i>Balance brought forward on 1 January</i>	9 783 287	3 360 768
<i>Total received from institutions as payments to Telkom</i>	59 119 842	54 066 278
<i>Less total paid to Telkom on behalf of institutions</i>	(59 603 712)	(49 903 513)
<i>Plus grants drawn down from designated funds</i>	38 257	3 111 108
<i>Plus amount drawn down to fund DITCHE projects</i>	2 808 651	556 910
<i>Less reversal of unspent DITCHE project drawdowns</i>	-	(565 384)
<i>Less amount paid to other DITCHE project creditors</i>	(1 940 924)	(842 880)
Own current account	6 794 742	3 377 256
Current account	17 000 143	13 159 543
Designated funds held in bank	15 329 599	7 359 972
	32 329 742	20 519 515
5 Accounts payable		
Included in accounts payable -		
Net amount held as agent in current account	10 205 401	9 783 287
Other creditors	475 845	117 000
	10 681 246	9 900 287
6 Cash generated by operations		
Operating income before interest	592 213	896 925
Adjustments for -		
- Depreciation of fixed assets	492 659	102 213
Donations received	-	-
Interest received on donations	798 313	608 446
Operating income before working capital changes	1 883 185	1 607 584
(Increase)/decrease in accounts receivable	163 859	(113 888)
Increase/(decrease) in accounts payable	3 866 161	6 271 485
	5 913 205	7 765 181

7 A grant USD 1 million from the Andrew W Mellon Foundation at the end of 2005 permits the mounting of an entirely new program called Fostering National Research and Education Networks in Africa (FRENIA). When applying for this grant, TENET undertook to set aside \$ 300,000 of its own reserves for the FRENIA program. For this reason, R1.8 million has been transferred to the Donors Designated Fund.

8 The Department of Science and Technology elected to pay in advance for capital equipment to be procured and work to be done by TENET on the SANReN Project during 2005. The amount shown is the unspent balance plus interest earned thereon. TENET awaits DST's instruction as to the disposition of this amount.